

**Summary**  
**Draft Supplemental Work Plan – Second Draft Environmental Impact Statement**  
**For the**  
**LOST RIVER SUBWATERSHED**  
**of the**  
**POTOMAC RIVER WATERSHED**  
**Hardy County, West Virginia**  
**West Virginia Second Congressional District**

**EIS Prepared by:** Natural Resources Conservation Service (lead federal agency)

**Project Sponsors:** Potomac Valley Conservation District  
Hardy County Commission  
West Virginia State Conservation Committee

**Proposed Action:** Construction of multiple purpose Site 16 for flood control and water supply on Lower Cove Run and deletion of Site 23 on Cullers Run in the Lost River Watershed

**Purpose and Need for Action:**

- Project purposes: flood control, rural raw water supply, and watershed protection
- Watershed problems consist of flooding, loss of agricultural productivity, erosion and sediment damage, degraded water quality, threats to human health and safety as a result of flooding, impaired land use, and lack of dependable raw water supplies. Opportunities exist to reduce flooding, reduce erosion and sedimentation, improve human health and safety, ensure adequate and dependable raw water supplies, and enhance agricultural productivity as a result of the Lost River Subwatershed Project.

**Description of the Recommended Alternative:**

The recommended alternative is to construct Site 16 as a multiple-purpose flood control and water supply structure and to delete Site 23 from the Work Plan. The purpose for Site 16 has changed from flood control and recreation to flood control and water supply with incidental recreation.

**Resource Information:**

- 38°55'28" degrees North latitude and 78°49'41" degrees West longitude
- Hydrologic Unit Number 02070003
- Moderate Climate with few summer and winter extremes
- Lost River Watershed Size - 117,200 acres (183 square miles)
- Land Uses: 8% cropland, 16% grassland, 73% forestland, 3% miscellaneous
- Floodplain Land Use downstream of Site 16 (acres): 245 forestland, 75 miscellaneous, 396 grassland, 872 cropland
- Land Ownership: 75% private; 3% state-local; 22% federal
- Watershed Demographics
  - Hardy County Population (Census estimate July 2007) 13,661
  - Lost River Watershed Population (estimated) 2,804
  - 100% Rural Households, 99% White

- Hardy County Per Capita Income \$19,449; National Per Capita Income \$29,469
- Hardy County Unemployment Rate 5.3%; National Rate 7.1% (December 2007)
- Hardy County Poverty Rate 13.1%; National Rate 12.4%
- Median House Value (2000 Census) \$74,700
- Median Household Income (2000 Census) \$33,778
- Median age of population (2000 Census) 38.9
- Farm Information (2007 Census of Agriculture)
  - Number of Farms in Hardy County 514
  - Average Farm Size 261 acres
  - Market Value of Agricultural Products Sold (average per farm) \$287,994
- Archeological Sites Investigated as a result of Lost River Subwatershed Project  
Phase I – 43 sites; Phase II – 24 sites; Phase III – 2 sites
- Resource Concerns Relevant to Scoping: flood damages, erosion and sedimentation, agricultural productivity, water supply, recreation, water quality, endangered & threatened species, environmental justice, fish & wildlife coordination, cultural resources, invasive species, NED account, prime & unique farmland, public health & safety, riparian areas, waters of the US, wetlands
- Alternatives Considered
  - No Action Future Without Project Alternative
  - Alternative 1 – 3 as-built sites, land treatment, construction of multiple-purpose Site 16 for flood control and water supply, and deletion of Site 23
- About 16.02 acres of wetlands will be impacted by proposed Site 16 Project
- Mitigation Measures Proposed will be finalized during the 404 permitting process.  
Estimated costs for anticipated mitigation measures are included in Site 16 construction costs

**Project Costs – Alternative 1 (3 as-built sites, land treatment, construction of Site 16, deletion of Site 23):**

Construction	PL 534 Funds		Other Funds		Total	
	Dollars	Percent	Dollars	Percent	Dollars	Percent
Construction	42,371,200	92%	3,699,700	8%	46,070,900	100
Engineering	3,074,700	95%	151,700	5%	3,226,400	100
Relocation	348,800	82%	74,100	18%	422,900	100
Real Property Rights	4,674,400	48%	4,984,300	52%	9,658,700	100
Administration	867,200	85%	152,800	15%	1,020,000	100

**Annual Project Benefits (Alternative 1):** flood damage reduction benefits \$681,600; water quality improvement \$290,600; incidental recreation \$910,300; water supply \$1,166,800; other benefits as indicated in Tables 5 and 6

**Net Annual Beneficial Effects (Alternative 1):** \$541,400

**Benefit Cost Ratio of Alternative 1, Supplement #4:** 1.17

**Period of Analysis:** 100 years @ 4 5/8% project discount rate

**Project Life:** 100 years

**Alternative 1 Benefit/Cost Ratio @ 1974 authorized project discount rate of 5 1/2%:** 1.05

**Environmental Impacts (Alternative 1):** Potential environmental impacts include 16.02 acres of wetlands, 27.9 acres of prime farmland, 3,040 feet of linear feet perennial cold water stream, 6,080 linear feet of riparian habitat, and 222.5 acres of private land converted to public use. Environmental impacts to wetlands and wildlife habitat will be fully mitigated during the 404 permitting process.

**Major Conclusions:** Alternative 1, which includes construction of multiple-purpose Site 16 and deletion of Site 23, is the Recommended Alternative.

**Areas of Controversy:** Opposition by affected landowners at Site 16

**Issues to be Resolved:**

**Draft Supplemental Work Plan No. 4  
and  
Second Draft Environmental Impact Statement  
for the  
Lost River Subwatershed  
of the  
Potomac River Watershed  
Hardy County, West Virginia**

**INTRODUCTION**

The Lost River Subwatershed Work Plan, for watershed protection and flood control, was approved for operations on February 11, 1975, under the authority of the Flood Control Act, Public Law 78-534. Sponsors of the project are Hardy County Commission, Potomac Valley Conservation District, and the West Virginia State Conservation Committee.

The Work Plan, prepared in October 1974, includes provisions for land treatment measures covering 94,750 acres, four single-purpose flood control dams, and one multiple-purpose flood control/recreation dam. A Final Environmental Impact Statement (FEIS) was issued in October 1974, covering the work to be installed as described above. For a description of project elements, alternatives, environmental resources, and projected impacts, the 1974 FEIS should be consulted. This document is available from the NRCS at the following address:

USDA – Natural Resources Conservation Service  
75 High Street, Room 301  
Morgantown, West Virginia 26505

The 1974 Work Plan has been supplemented three times to add sponsors, change the land treatment program, and add rural water supply to one structure. Costs and benefits and project effects were updated in each supplement. Currently, land treatment measures have been applied

on 95,708 acres and three of the five originally planned dams; Site 4, Site 27, and Site 10; are complete.

### **PURPOSE AND NEED FOR PROPOSED ACTION**

The 1974 Work Plan – FEIS and subsequent supplements contain a discussion of aspects of the watershed project, such as description of the watershed and watershed problems, that are not explicitly discussed in this report. These documents should be consulted for opportunities, goals, needs, and resource problems pertinent to the Lost River Watershed.

The proposed purposes of this project under PL-534 are:

- Watershed protection
- Flood prevention
- Rural water supply

The underlying need for the proposed action is tied to the recurrence of damaging floods in the watershed and the projected need for additional rural water supply through Year 2060 in the Lost River Subwatershed.

### **Background for the Purpose and Need**

This supplement re-affirms the occurrence of damaging floods in the watershed and the continued need for flood control measures. Damaging floods have occurred in the watershed, on average, every 10 years. The floods of 1936, 1942, 1949, 1954, 1970, 1976, 1979 (loss of life on Bakers Run), 1985, 1996, and 2003 caused damage in the watershed. Approximately 1,900 acres of the watershed are floodplain, excluding the stream channel, extending from the headwaters of the watershed above Mathias to Wardensville and downstream to the contiguous

Upper Cacapon River floodplain. Refer to the floodplain maps in Appendix B for more information. Damageable properties include homes, roads, bridges, commercial properties, farm buildings, fencing, crops, pastureland, livestock, agricultural improvements, and public utilities. As part of this supplemental update, land use patterns in the floodplain and the type and number of damageable properties were verified and updated to reflect current conditions. Refer to the “Investigation and Analysis” section in Appendix C for more information on flood damage determinations.

#### **Conditions Requiring a Supplement to the Project Plan**

This supplement to the 1974 Work Plan (as previously supplemented) is required because of the sponsors’ request to change the purpose of Site 16 and to modify the extent of the overall project by eliminating Site 23. This supplement updates and reanalyzes the environmental impact statement, reassesses project feasibility, and documents changing conditions in the watershed. The objectives of this Supplement are to compile and evaluate economic and environmental data necessary for compliance under the National Environmental Policy Act, Clean Water Act, and other pertinent authorities and statutes; evaluate the impacts of deleting the recreational component at Site 16; evaluate the impacts of adding water supply to Site 16; evaluate the impacts of deleting Site 23; and reaffirm project feasibility. NRCS policies and procedures as outlined in the NRCS National Watershed Manual (NWM, 1992) are used in the preparation of this combined Draft Supplemental Watershed Plan and Second Draft Environmental Impact Statement.

### **Change in Purpose for Site 16:**

Lost River Site 16, located in eastern Hardy County near the community of Lost City, was originally planned as a multiple-purpose recreation and flood control impoundment. However, since the original Work Plan for Lost River was written in 1974, additional recreation facilities have been developed nearby at Lost River State Park, Trout Pond, Rock Cliff Lake, and Warden Lake. With the exception of meeting the demand for fishing, these facilities increased opportunities for outdoor recreation for the area and duplicated much of the facilities development that was planned at Site 16. As a result, the Sponsors requested the deletion of developed recreation as a project purpose at Site 16. Incidental recreation such as fishing, bird watching, boating, and hiking will still occur at Site 16.

However, just as changing conditions in the watershed caused the Sponsors to request the elimination of the developed recreational component, another critical need has been identified. During the re-evaluation of Site 16, the importance of water supply for Hardy County has been emphasized by the local sponsors. In 2004, the Hardy County Water Resources Study identified the need for additional water supplies in eastern Hardy County. In light of rapid development trends in housing and highway construction, Sponsors refined their projected water needs. Residential and commercial water supply needs were projected through Year 2060. Trends in housing growth, population growth, and highway development were used to predict the future water demand in the Lost River Valley and surrounding areas. Projections indicate that the water supply in Lost River Site 10 will meet about 75% of the estimated Year 2020 demand during the most critical drought periods. Sponsors recognize an immediate need to seek additional water supply sources. Additional water is needed from other sources to fully meet the projected 2040

need and to partially meet the needs through Year 2060. Appendix E contains the Sponsors' Water Supply Needs document. Therefore, the Sponsors requested that water supply be evaluated as a potential added purpose to Site 16.

Infrastructure development such as water supply is necessary to meet the needs of a growing population in eastern Hardy County. Public Law 78-534 allows for the addition of water supply in structures, provided there is justification for such a measure. In the case of Site 16, it is proposed that 400 acre-feet of the permanent pool be converted from a recreational pool to a water supply pool. Based on a safe yield analysis (extreme drought conditions), the storage in Site 16 and the storage in Site 10 will meet the projected water supply needs through approximately Year 2040. Water is essential for development at the Baker Industrial Park and the industrial park proposed for the Wardensville area. Construction of the Appalachian Corridor H highway, a new four lane route that traverses the watershed, is already spawning development and the need for plentiful, dependable water. Therefore, the Sponsors requested evaluation of the potential to add water supply as a purpose to Site 16.

### **Evaluation of Site 23:**

The viability of Site 23, one of the two remaining structures planned as part of the original project, was assessed as part of this report. Site 23 was a planned single-purpose flood control structure located on Cullers Run 2.5 miles upstream of the confluence with Lost River.

Additional engineering and geologic evaluations done in 1999 were reviewed for this report.

Results of the geologic investigation did not show adequate on-site material for the construction of the impervious core needed for construction of an earth embankment. Off-site borrow



material or alternative construction methods, such as roller-compacted concrete, were considered. Any of these methods would increase the cost of the site from the original planning cost (indexed to 2006 dollars) from \$4,414,200 to approximately \$32,000,000. Based on these engineering and geological concerns and the associated economic impacts, Site 23 has been deleted from the Lost River Watershed Plan. The removal of Site 23 for the Work Plan has been considered in the overall project effectiveness.

### **SCOPE OF ENVIRONMENTAL IMPACT STATEMENT**

This section documents the range of issues and impacts considered in developing this report, some of which were identified through the public and interagency scoping process. Tabulation 1 lists the environmental, economic, and social resource concerns identified during the project scoping as well as resource concerns that must be considered by NRCS. The degree of concern and relevance to the proposed action were determined through interagency consultation and through public participation during the development of this supplement.

**TABULATION 1**  
**SUMMARY OF SCOPING**  
**LOST RIVER SUBWATERSHED**

Resource Concern	Relevant to the Proposed Action?		Rationale
	Yes	No	
<b>Sponsors, Public, Agencies</b>			
Flood Damages	X		Flood damages a concern in watershed
Soil Erosion and Sedimentation	X		Sediment & erosion a concern in watershed
Agricultural Productivity	X		Area of high agricultural productivity
Water Supply	X		Identified as critical need by Sponsors
Recreation	X		Duplicate recreational resources identified; changed purpose as a result
Water Quality	X		Lost River TMDL
<b>NRCS Requirements</b>			
Air Quality		X	Project not in an air quality non-attainment area
Ecologically Critical Areas		X	None present in area of project impact
Endangered and Threatened Species	X		No federally listed species present (USFWS letter dated August 15, 2005 on file)
Environmental Justice	X		No disproportionally high or adverse effects anticipated to tribes or minorities.
Essential Fish Habitat		X	Lower Cove Run not designated essential fish habitat
Aquatic Resources	X		Convert cold water perennial stream to warm water lake
Land Use and Upland Habitat	X		Convert woodland, hayland and pasture to lake, dam and spillway
Floodplain Management		X	County zoning ordinance in effect; county participates in floodplain management program
Historic, Scientific, and Cultural Resources	X		Phase I and Phase II archeological testing completed. No adverse effects anticipated.
Invasive Species	X		Disturbed areas will be revegetated quickly to discourage spread of invasive plants
Migratory Birds		X	No long-term adverse effect on migratory bird populations
National Economic Development Account	X		Required by the Water Resource Council Principles & Guidelines
Natural Areas		X	No effect on designated natural areas
Parklands		X	None present in area of project impact
Prime Farmland	X		Prime farmland removed from agricultural production
Public Health & Safety	X		Potential for loss of life due to flooding
Regional Water Resource Plans/Coastal Zone Management Areas		X	Project is not in a regional water resource planning area or a coastal zone management area
Riparian Areas	X		Riparian habitat converted to lake, dam and spillway
Scenic Beauty		X	Scenic attributes of watershed not appreciably effected
Waters of the US	X		Perennial stream converted to dam, spillway and lake
Wetlands	X		Wetlands will be impacted by the installation of the project
Wild & Scenic Rivers		X	Wild & Scenic River Status does not apply

## **AFFECTED ENVIRONMENT**

Population and housing growth, recreational amenities, and highway construction have increased the need for dependable water supplies in the watershed. There has also been growth in the agricultural poultry industry in the Lost River Valley. Other watershed conditions remain similar as described in the 1974 Work Plan – FEIS. The Lost River area has experienced an above average increase in population and housing growth over the past three to four decades. This increase corresponds to infrastructure improvements such as recreation amenities and highway construction. Such increases are associated with the continuous westward expansion and urban sprawl of the Washington, DC-Baltimore metropolis. Rural areas such as the Lost River Watershed are experiencing second home growth and development pressure, spurred in part, by the construction of the Appalachian Corridor H Highway. These changes have increased the need for a more dependable water supply than what has been relied on in the past. A dependable and sustainable water supply is necessary to support this growth. Thus, water supply is being proposed as a project purpose to Site 16 at the request of Project Sponsors. Since the completion of the 1974 Work Plan – FEIS, several recreational amenities have been added to the Lost River area, reducing the need to include similar developed facilities at Site 16. As a result, the Sponsors' request this project purpose be deleted. However, there will still be incidental recreation, largely in the form of fishing, available at Site 16.

Environmental resources that will be impacted at the proposed Site 16 location include 16.02 acres of wetlands, 27.9 acres of prime farmland, 3,040 linear feet of perennial cold water stream, and 6,080 linear feet of riparian habitat impacted. Additionally, 222.5 acres of private land will

be converted to public uses, directly impacting 17 parcels of land including the Forest Service parcel.

## **ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DETAILED STUDY**

Several alternatives were considered in order to meet the purpose and need for this proposed federal action. The following discussion provides information regarding several alternatives that were considered but were ultimately eliminated from further study and comparison in this EIS, and the reasons for elimination.

### **Alternative Analysis for Flood Control:**

An extensive alternatives analysis was done during the planning phase of the 1974 Lost River Subwatershed project. The 1974 Work Plan - FEIS contains a detailed description of the alternatives studied during formulation of the Lost River project as well as their expected impacts. These alternative measures include land treatment, flood proofing, flood insurance, floodplain purchase, stream channel modification, diking, impoundments, and various combinations thereof. An evaluation of alternatives to address flooding and water supply was conducted as part of Supplement #3 in March 2001 and again in this supplement with regard to their applicability and effectiveness given current watershed conditions. Additional alternatives such as stream bank restoration, riparian plantings, wetland restoration, restoration and preservation of floodplain areas, storm water and agricultural runoff management, dry dams, and property relocations were addressed based on comments received following the release of the first Draft Supplemental EIS issued September 2006.

### ***Land Treatment Alone***

Extensive land treatment has been applied as a component of the authorized Lost River Watershed project and has resulted in a reduction in sediment and erosion in the watershed. It has also improved agricultural productivity, improved soil moisture conditions, and prevented excessive loss of topsoil. However, as was the case in 1974, land treatment best management practices are ineffective in reducing flooding sufficiently to prevent damages during significant rainfall events in the Lost River watershed. Although land treatment practices meet the need for improved conservation of the watershed resources, they alone do not meet the need for flood control and water supply.

### ***Floodproofing and Flood Insurance***

As detailed in the 1974 Work Plan – FEIS and confirmed by re-evaluation during this planning effort, a combination of floodproofing and flood insurance is relatively ineffective in reducing flood damages to roads, bridges, most agricultural outbuildings, livestock, crops and fencing. These types of properties are not eligible for flood insurance and therefore, would not be covered under this alternative. Floodproofing typically involves elevating homes and businesses or building individual flood walls around damageable property. Such measures are not practical or cost-effective for farmland, roads, bridges, farm buildings, fences, and livestock. This alternative would be voluntary, reducing the likelihood that maximum benefits would be realized. This alternative does not meet the need for water supply. Given that this would not meet the underlying need, this alternative has been eliminated from further consideration.

### ***Stream Channel Modification and Diking***

Stream channel modification, diking, riprap, and bridge modifications were evaluated in 1974 as an alternative to reduce flooding. For the reasons cited in the 1974 Work Plan, including degraded habitat in about 15 miles of Lost River and increased peak flows and flood damages downstream, this alternative is no more applicable or feasible now than it was in 1974. This alternative does not provide sufficient flood protection to justify the costs and environmental impacts associated with this option. Flood damages to farming operations in the Lost River floodplains would still occur when flooding exceeds channel capacity, which is usually a 2-year frequency discharge (<http://www.epa.gov/warsss/seds/source/bankfull.htm>). This alternative is ineffective in reducing damages and is too environmentally damaging to implement. Also, it does not meet the need for water supply. Because this alternative would not be technically reasonable, it has been eliminated from further consideration.

### ***System of Upstream Impoundments***

Locations for as many as 30 upstream impoundments were evaluated for the original 1974 FEIS. These prospective impoundments were analyzed in different combinations and with other alternative measures as a means of providing a high level of flood damage reduction. This detailed analysis was conducted to determine the most effective combination of structures. The result was the recommended plan consisting of the five originally proposed Lost River impoundments. Three of these sites have been constructed.

As part of this supplemental evaluation, engineering, geology, and hydrology factors were re-considered to determine whether the remaining two impoundments from the original

Recommended Plan was still the most viable alternative. As discussed in the “Need for Supplement” section of this Second Draft EIS, Site 23 proposed for Cullers Run was re-evaluated, along with a second dam location, because of engineering and geology concerns. Neither of these Cullers Run sites were determined to be feasible and therefore Site 23 was eliminated from the Recommended Plan. No new locations for impoundments were identified as viable components of the Recommended Plan. The combination of Sites 4, 10, 16, and 27 was determined to be the best option for meeting the Sponsors’ objectives for flood control and water supply and so the evaluation of this alternative was eliminated from further consideration.

### ***Floodplain Purchases and Relocation***

Floodplain purchasing would require government acquisition of all the flood prone structures and farmland in the Lost River Valley. Acreage in the floodplain is approximately 1,900 acres. In order for this alternative to be effective at reducing damages, there would have to be 100 percent voluntary participation or the possible use of eminent domain on a large number of properties. Floodplain land would be returned to natural conditions and removed from agricultural production. Roads and bridges would be ineligible and would continue to incur damages. Removal of approximately 1,900 acres from private ownership, most likely through broad condemnation powers, would negatively impact the future tax base of the area and be socially disruptive. All farmland and income from such operations would be removed from the local economy (tax base). Relocation of agricultural operations to other prime flood-free agricultural land equivalent to the Lost River floodplain would be impossible in West Virginia. The social impacts of a non-voluntary floodplain purchase and relocation alternative exceed those of the other alternatives. Furthermore, this alternative does not meet the need for water supply. Given

this alternative would not meet the underlying need, it has been eliminated from further consideration.

### ***Stream Bank Restoration***

Stream bank restoration is a process that restores the vegetation, channel cross sectional area and/or the slope of an altered stream bank to more stable conditions. This is done to address excessive stream bank erosion, enhance aquatic habitat, improve riparian corridors and improve water quality. The flow capacity of a natural stream channel is generally a 2-year frequency discharge (<http://www.epa.gov/warsss/seds/source/bankfull.htm>). The vegetation along the stream bank creates resistance to flow, which results in lower water velocities, less soil erosion and potentially higher water surface elevations. While there are environmental benefits associated with this alternative, it would not appreciably reduce flooding in the watershed. This alternative does not meet the need for flood control or water supply. Given this alternative does not meet the underlying need, it has been eliminated from further consideration.

### ***Riparian Planting***

Riparian planting is a process that restores woody vegetation on an unstable stream bank to create more natural conditions. This is done to address stream bank erosion, enhance aquatic habitat, improve riparian corridors and improve water quality. The flow capacity of a natural stream channel is generally a 2-year frequency discharge. The vegetation along the stream bank creates resistance to flow, which results in lower water velocities, less soil erosion and potentially higher water surface elevations. While there are environmental benefits associated with this alternative, it would not appreciably reduce flooding in the watershed. This alternative does not meet the need for flood control or water supply. Given this alternative does not meet the underlying need, it has been eliminated from further consideration.



### ***Wetland Restoration***

Wetland restoration is the rehabilitation of previously existing wetland functions, from a more impaired to a less impaired or unimpaired state of overall function. Wetlands are capable of improving water quality and reducing peak runoff, providing they are located upstream of damage areas and comprise a considerable portion of the drainage area in order to have an appreciable effect. Based on values presented in the EPA publication (<http://www.epa.gov/owow/wetlands/pdf/Flooding.pdf>), a minimum of 844 acres of wetlands would be required to replace the 2,531 acre-feet of 100-year frequency flood storage that Site 16 is expected to provide. There are not 844 acres of suitable wetlands available upstream of damage areas in the watershed, therefore it is not possible to achieve the same level of flood control with this alternative. Further, the construction of this amount of artificial wetlands would require more than 800 acres of level floodplain land. This land would be mostly farmland that would be removed from agricultural production. This alternative does not meet the need for flood control or water supply. Because this alternative would not be technically reasonable, it has been eliminated from further consideration.

### ***Storm Water and Agriculture Runoff Management***

Storm water management is used to address impervious surfaces such as roofs, roads, driveways, streets and parking lots that prevent storm water runoff from naturally soaking into the ground. It is usually applied in developing areas in order to keep post development volume and peak rate of storm water discharges at the predevelopment values. The runoff control measures are typically designed for storms between 1-year and 25-year frequencies and do not provide flood protection for larger storms.

Agriculture runoff management can be used by farmers to reduce erosion, sedimentation, and chemical transport by applying management measures to fields and pastures. The volume and peak rate of storm water discharges are reduced by measures such as stream bank restoration, riparian buffer establishment, stream bank fencing, and conservation tillage. These actions are primarily used to address water quality and would not appreciably reduce the flooding in the watershed. This alternative does not meet the need for flood control or water supply. Because this alternative would not be technically reasonable, it has been eliminated from further consideration.

### ***Dry Dams***

A dry dam is a dam constructed for the purpose of flood control. Dry dams are designed to allow the stream to flow freely during normal conditions. Dry dams do not maintain a permanent pool of water. During periods of intense rainfall, the dam holds back the excess floodwater and releases it downstream at a controlled rate.

A dry dam does not differ significantly from a dam with a permanent pool. The primary difference between the two types of dams would be in the operation of the intake riser. The dry dam intake riser would have the lower gate normally open, while the dam with a permanent pool would have the intake riser lower gate normally closed. Construction costs are reasonably the same for dry dams and conventional dams. Because the dry dam does not contain water supply storage, this alternative does not meet the need for water supply. Therefore, it has been eliminated from further consideration.

### **Alternative Analysis for Water Supply:**

Several water supply alternatives were considered. Ground water and surface water sources were evaluated to determine their potential to meet the future water supply needs of the Lost River Subwatershed (as further described in Appendix E).

#### ***Groundwater***

Two types of ground water sources, wells and springs, are heavily used to meet the present water demands in the area. Currently, wells and springs provide water to all the residents and businesses in the Lost River Subwatershed. Springs are common in Hardy County and are utilized as a water supply source for several localities. Wells are the sole source of water for the approximately 430 poultry house operations in the county, representing an intensive existing demand on the ground water resources.

These ground water sources are unreliable in the long-term due to restricted yields and would not meet future water quantity needs, particularly for any large scale industrial, commercial, or residential development. They are also subject to poor rates of recharge during periods of drought, as experienced most recently during the drought of 1999. As indicated in the Hardy County Water Resources Report, springs and wells do not have the potential to provide water in sufficient amounts to meet the long-term needs of the Lost River Subwatershed. These sources are especially vulnerable during drought conditions. During the 1999 drought, farmers used the Site 4 impoundment for emergency raw water supplies. Through the Emergency Conservation Program, producers drilled some new wells and acquired truck-mounted water tanks to haul water from the impoundment to their operations. This drought event, and the impact it had on

the local economy, reinforced the need to consider adding rural raw water supply to any future watershed projects. Due to the restricted yields and susceptibility to drought, groundwater has been eliminated from consideration as an alternative for water supply. Because this alternative would not be technically reasonable, it has been eliminated from further consideration.

### ***Rivers and Streams***

Rivers and streams were also evaluated as to their potential to meet water supply needs. Surface waters are subject to the same drought conditions as wells and springs, making streams and rivers susceptible to extreme low flow and no flow at times. Historical gage flow data (United States Geological Survey river gage at McCauley) show that the Lost River Subwatershed is at base flow during many of the late summer/early fall seasons. Base flow condition exists when the streams are totally recharged by groundwater. Under these conditions, placing an intake in Lost River for removal of any additional water from the stream system would be detrimental to the aquatic ecosystem. There are no water supply systems dependent on stream intakes in the Lost River Subwatershed due to the unreliable nature of this supply source. Because this alternative would not be technically reasonable, rivers and streams have been eliminated from further consideration as an alternative.

### ***Water Purchase Agreements***

Water purchase agreements were considered as another option to meet the water supply needs of the area. A water purchase agreement is an arrangement in which one community enters into an agreement to purchase water from another nearby municipality. The existing municipal water supply systems in Hardy County serve approximately 39% of the county population, with the

Hardy County Public Service District, Moorefield and Wardensville having the largest service areas. The largest potential customer base for expanded public water is in the Baker area.

Wardensville is the nearest municipal water system, but constraints such as a reliable water supply prevent that source from being considered as a reasonable alternative. Moorefield is nearly 22 miles to the west, in the South Branch River Subwatershed, and is too geographically distant to be practical. Therefore, water purchase agreements are not considered to be a reasonable alternative and have been eliminated from further consideration.

### ***Water Conservation***

In some situations, water conservation measures are a reasonable means of increasing the efficiency of an available water supply. Water conservation measures include reduction of excessive unaccounted for water (i.e., water lost in water systems due to leakage and unmetered use), and use of more efficient appliances and water conservation devices (e.g., low-flow toilets and showerheads, etc.). These measures typically apply to communities which are being serviced by older systems that are in need of upgrading. Because there are no existing systems in the Lost River Subwatershed, there are no options to implement systematic conservation measures. In reality, many rural households already practice water conservation because of the limited yield of their individual springs or wells. Thus, water conservation measures are not a reasonable option for meeting the future water supply needs of the Lost River Subwatershed and, therefore, water conservation has been eliminated from further consideration.

### ***Impoundments***

There are nine existing impoundments in Hardy County that provide flood control, recreation, and/or water supply benefits. Three of these are located in the Lost River Watershed – Site 27, Site 4 and Site 10. Site 10 is the only impoundment that is designed for flood control and water supply. The potential for Site 10 to meet all the water supply needs of the Lost River Watershed was evaluated. The other two sites, Site 27 and Site 4, were also evaluated as to their potential for expansion to include permanent water supply storage.

Site 10 was considered as an alternative to meet all the needs of the entire Lost River Watershed. As per Supplement #3 to the 1974 Lost River Subwatershed Work Plan – FEIS, Site 10 was modified to include 400 acre-feet of dedicated water supply. Engineering information in the Supplemental Environmental Report for the Hardy County Public Service District (USDA, Rural Utilities Service 2004) suggested 360,000 gallons per day (gpd) as a “guaranteed” minimum output. This was determined by simply calculating the daily withdrawal of 360,000 gpd that 400 acre-feet of storage would supply for a year. The “guaranteed minimum” amount does not take into account inflow to the system or losses due to evaporation or seepage. The safe yield analysis for Site 10 indicates that the site will provide about 600,000 gallons per day during drought conditions (Gannett Fleming 2005-2006). This amount falls 200,000 gpd short of the projected water demand of 800,000 gpd by Year 2020 for the Lost River Subwatershed. This short fall requires that an additional source be identified. (For more information on water supply calculations refer to Appendix E).

Site 27 is located on Upper Cove Run, a tributary of Lost River. The dam site is located approximately 3.0 miles south of the community of Mathias. This is a single-purpose earth and rock fill impoundment built for flood control. The site has a drainage area of 3.75 square miles. Because of the small drainage area, this site is not suitable for incorporating water supply.

Site 4 is located on Kimsey Run, a tributary of Lost River. The dam site is located approximately one-half (0.5) mile west of the community of Lost River. This single-purpose flood control impoundment has a drainage area of 32.41 square miles. With this site's drainage area, it has potential for incorporating a dedicated and dependable water supply. Given this potential, the NRCS conducted an analysis of the costs and associated engineering requirements to add 400 acre-feet of water supply to Site 4. The investigation revealed that the elevation of top of dam, auxiliary spillway crest, and intake riser crest would have to be increased. These modifications would require the acquisition of at least 44 acres of land rights (property acquired in fee, flowage easements or a combination). The permanent pool would be raised approximately 5.5 feet in elevation. The existence of residences, buildings, roads and utilities within this area were not determined in this analysis. It is likely that Sponsors would have to use eminent domain to acquire additional landrights at Site 4. These landrights would need to be acquired from many of the same landowners that were impacted when Site 4 was built.

Construction modifications to Site 4 would require draining the lake for at least one construction season as the changes were made to the structure and appurtenances. There would be a loss of the established fishery for three to five years. The costs associated with modifications to Site 4

would be approximately \$9,500,000. This amount does not include road and utility relocations or additional landrights.

The modification of Site 4 would result in adverse environmental effects. These include raising the permanent pool over five feet in elevation and the temporary or permanent inundation of additional acreage. This modification would also eliminate an established public fishery for 3 to 5 years and require relocation of roads and utilities for a second time. Adverse social impacts will result from the potential use of eminent domain to acquire private property from landowners who were previously impacted by the original construction of Site 4. In addition, the cost of adding a water supply component to Site 4 exceeds the cost of including the water supply component at Site 16. The flood damage reduction benefits, incidental recreation, and other benefits afforded by Site 16 would not be achieved. For the reasons stated above, this alternative has been eliminated from further consideration.

## **SUMMARY AND COMPARISON OF ALTERNATIVES NOT ELIMINATED FROM FURTHER STUDY**

Two alternatives are therefore evaluated and analyzed in this Draft EIS: the No Action Future Without Project Alternative and Alternative 1 – construction of Site 16. A summary and comparison of these two alternatives, as well as the existing conditions in the watershed, for specific economic, environmental and social concerns identified during the scoping process is provided in Tabulation 2.



### **No Action Future Without Project Alternative**

The No Action Future Without Project Alternative consists of no additional sites being built and no additional costs and benefits incurred. Several problems will continue without the flood control aspect of the proposed dam. People and livestock will remain at risk, while homes, buildings and crops will continue to suffer monetary damages from flood water. Transportation on Route 259 will continue to be disrupted during floods, which will result in economic losses through lost wages, inventory delays and road repairs. Chemicals and nutrients will continue to be washed from fields and pastures into streams during floods, resulting in water quality degradation.

The lack of a dependable water supply will result in increased demand on ground water, retarded development, and water shortages during droughts. Unregulated stream withdrawals could negatively impact plants, fish and wildlife throughout the watershed as the streams and river are used for emergency water supply during periods of drought. Well production rates are low (<50 gpm) due to the low porosity and hydraulic conductivity of the aquifers, which translates to higher investment and operating costs for the numerous wells that would be required to supply large volumes of water to consumers. The lack of a dependable water supply will also result in continued higher fire insurance premiums for homeowners and businesses due to an insufficient water supply for fire protection.

## **Alternative 1**

Alternative 1 consists of construction of a multiple purpose impoundment, Site 16, on Lower Cove Run that will provide flood damage reduction and water supply. Site 16 will meet the Sponsors' needs for additional flood damage reduction for the Lost River Valley and will provide 400 acre-feet of rural water supply (safe yield analysis of 700,000 gpd ) for the needs of current and future residents of the watershed (Refer to the Water Supply Report in Appendix E for more information on the projected needs and the safe yield analysis). Incidental to flood reduction and water supply, the development of Site 16 would provide opportunities for fishing and therefore contribute to meeting the demand for this type of recreation in the area.

**TABULATION 2**  
**SUMMARY AND COMPARISON OF ALTERNATIVES AND EXISTING CONDITIONS**  
**LOST RIVER SUBWATERSHED**

<b>Effects</b>	<b>Existing Conditions As-built Sites 4, 10, 27; completed land treatment <sup>1/</sup></b>	<b>Alternative 1 As-built Sites 4, 10, 27; completed land treatment; construction of Site 16; deletion of Site 23 <sup>1/</sup></b>	<b>No Action (Future Without Project) Alternative</b>
Project Investment <sup>2/</sup>	\$35,533,100	\$64,857,200	\$35,533,100
<b>National Economic Development Account (Economic information is displayed as per the NWM, Standard Tables 1-6)</b>			
Beneficial annual	\$2,660,000	\$3,638,200	\$2,660,000
Adverse annual	\$1,906,300	\$3,096,800	\$1,906,300
Net Beneficial annual	\$753,700	\$541,400	\$753,700
Flood Damage Reduction benefit	\$477,200	\$612,300	\$477,200
Water Quality benefits	\$228,000	\$290,600	\$228,000
Changes in Land Use	\$55,200	\$70,300	\$55,200
Incidental Recreation benefits	\$767,900	\$910,300	\$767,900
Secondary & Redevelopment benefits	\$406,700	\$518,600	\$406,700
Water Supply benefits	\$655,700	\$1,166,800	\$655,700
Land Treatment benefits	\$69,300	\$69,300	\$69,300
<b>Environmental Quality Account (Alternative 1 information is displayed for Site 16 only)</b>			
<b>Concerns</b>	<b>Existing Conditions As-built Sites 4, 10, 27; completed land treatment</b>	<b>Alternative 1 (Site 16 Only)</b>	<b>No Action (Future Without Project) Alternative</b>
Threatened & Endangered Species	No adverse effects identified	No federally listed species present	No federally listed species present
Wetlands	0.39 acres of wetlands adversely impacted. Adverse impacts minimized by creation of shallow water areas in upper end of pools.	16.02 acres of wetlands adversely impacted with construction of Site 16. More than 2 acres are within one foot of the pool elevation in the upper end.	No additional wetlands would be effected
Waters of the United States	Permanently eliminated 1.94 miles of perennial streams. 2.35 miles of stream subject to temporary inundation.	Site 16 will permanently eliminate 0.58 miles of perennial stream. 0.27 miles of stream subject to temporary inundation by Site 16.	No additional perennial stream length lost, converted or subject to increased temporary inundation.

Continued...

**TABULATION 2**  
**SUMMARY AND COMPARISON OF ALTERNATIVES AND EXISTING CONDITIONS**  
**LOST RIVER SUBWATERSHED**

<b>Concerns</b>	<b>Existing Conditions As-built Sites 4, 10, 27; completed land treatment</b>	<b>Alternative 1 (Site 16 Only)</b>	<b>No Action (Future Without Project) Alternative</b>
Aquatic Resources	Created 107.1 acres of permanent lake resources. Perennial streams lost, converted and inundated as described above.	Create 46.6 acres of permanent lake resources with Site 16. Perennial streams lost, converted and inundated as described above.	46.6 acres of permanent lake resources would not be created. Additional stream habitat not impacted
Recreation	Created 107.1 acres of flat water public fishing area. Create an estimated 40,217 person/days of fishing recreation annually.	Create 46.6 acres of flat water public fishing area. Create an estimated 7,456 person/days of fishing recreation annually at Site 16.	46.6 acres of flat water public fishing area and an estimated 7,456 annual person/days of fishing would not be created.
Riparian Areas	3.87 miles of riparian habitat along perennial streams were eliminated. 4.5 miles of lake shoreline were created.	An additional 1.15 miles of riparian habitat along perennial stream to be eliminated with Site 16. An additional 1.57 miles of lake shoreline to be created.	Additional 1.15 miles of riparian habitat along perennial stream would not be impacted. Additional 1.57 miles of lake shoreline would not be created.
Prime Farmland	35 acres of prime farmland taken out of production	27.9 acres of prime farmland taken out of production at Site 16.	Agricultural production on 27.9 acres of prime farmland would not be effected.
Water Quality	Temporarily increased erosion, sediment, turbidity, noise and air pollution during construction. Minimized adverse effects by applying BMPs. Lost River temperature increases minimized by installing cold water releases at Sites 4 and 10. Provide storage capacity for 890.4 acre/feet of sediment.	Temporarily increase erosion, sediment, turbidity, noise and air pollution during construction. Minimize adverse effects by applying BMPs. Lost River temperature increases minimized by installing cold water release at Site 16. Provide storage capacity for an additional 229 acre/feet of sediment at Site 16.	No temporary increase in erosion, sediment, turbidity, noise or air pollution would result from construction. No increase in temperature of Lost River would occur. No additional sediment storage capacity would be created.

Continued...

**TABULATION 2**  
**SUMMARY AND COMPARISON OF ALTERNATIVES AND EXISTING CONDITIONS**  
**LOST RIVER SUBWATERSHED**

<b>Concerns</b>	<b>Existing Conditions As-built Sites 4, 10, 27; completed land treatment</b>	<b>Alternative 1 (Site 16 Only)</b>	<b>No Action (Future Without Project) Alternative</b>
Land Use and Upland Habitat	416 acres of land utilized to develop 3 existing sites. 211.4 acres of woodland, hayland and pastureland permanently inundated and used for dam, spillway, and borrow. 186 acres of riparian and terrestrial habitats subjected to temporary inundation for floodwater detention.	234.4 acres required to develop Site 16. 86.6 acres of woodland, hayland and pastureland permanently inundated and used for dam, spillway, and borrow. 40.2 acres of riparian and terrestrial habitats subjected to temporary inundation for floodwater detention. 222.5 acres of private land converted to public use.	No additional private land will be converted to public uses. Agricultural and residential uses would remain on 222.5 acres of private land. No woodland, hayland, or pastureland would be altered.
Invasive Species	Invasive plant species already exist in watershed and at site	BMPs will be used to minimize spread of invasive plants	No effect on the invasive plant species already in watershed and at site
Historic and Cultural Resources	Phase I – 29 sites; Phase II – 21 sites; Phase III – 2 sites	Phase I – 14 sites; Phase II – 3	No additional investigations will be done
<b>Other Social Effects Account</b>			
Human health & safety	Improved with 3 structures built, flooding reduced – health & safety improved	Flooding further reduced with Site 16 – health & safety improved	No further improvement in human health and safety.
Dependable water supply	Improved with Site 10	Further improved with Site 16	No further improvement in water supply. Current situation expected to worsen with increasing demand.
Environmental Justice	No disproportionately high or adverse impacts to tribal or minority populations	No disproportionately high or adverse impacts to tribal or minority populations	No disproportionately high or adverse impacts to tribal or minority populations

Continued...

**TABULATION 2**  
**SUMMARY AND COMPARISON OF ALTERNATIVES AND EXISTING CONDITIONS**  
**LOST RIVER SUBWATERSHED**

<b>Regional Economic Development Account (Economic information is displayed as per the NWM, Standard Tables 1-6)</b>			
<i><b>Beneficial Effect Annualized (Benefits)</b></i>			
<b>Measures</b>	<b>As-built Sites 4, 10, 27; completed land treatment</b>	<b>As-built Sites 4, 10, 27; completed land treatment; construction of Site 16; deletion of Site 23</b>	<b>No further action</b>
Region	\$2,660,000	\$3,638,200	\$2,660,000
Rest of Nation	\$0	\$0	\$0
<i><b>Adverse Effect Annualized (Costs)</b></i>			
Region (non-federal costs)	\$242,100	\$419,100	\$242,100
Rest of Nation (federal costs)	\$1,195,100	\$2,374,300	\$1,195,100

<sup>1/</sup> 2009 Price base. See Standard Tables 1-6 for more information.

<sup>2/</sup> Economic Information is displayed for Lost River Watershed Project as per the NWM and consistent with Standard Tables 1-6

## **ENVIRONMENTAL CONSEQUENCES**

This section describes the existing conditions and the effects of the two alternatives on the resources of concern identified in Tabulation 1.

### ***Flood Damages***

#### Existing Conditions

Flooding was the original impetus for the Lost River Subwatershed project and it remains a resource concern for Sponsors. Flood damages continue to adversely impact property and human health and safety. Three of the five planned flood prevention structures are completed, reducing but not eliminating the estimated annual flood damages experienced in the watershed. Refer to Table 5 for more information on flood damage reduction benefits. About 43 square miles of drainage area are controlled by Sites 4, 10, and 27 out of a total of 183 square miles of drainage in the Lost River Subwatershed.

#### Alternative 1

Alternative 1 will further reduce flooding in the subwatershed. The installation of Site 16 on Lower Cover Run, a tributary to Lost River, will reduce flood damages in the Lost River watershed and increase the amount of drainage area controlled by flood retarding structures in the subwatershed. The Lost River Subwatershed has a total drainage area of approximately 183 square miles. Drainage area is defined as the area draining into a stream at a given point. Currently Sites 4, 27, and 10 have drainage areas that total approximately 43 square miles. With the construction of Site 16, an additional 11.88 square miles of the Lost River Subwatershed will be located upstream of dam structures. The total drainage area, or areas located upstream of the four structures (Sites 4, 27, 10, and 16) that drain to the structures, would then total about 55 square miles. This increased amount of drainage area located upstream of the dam structures

will further reduce downstream flood damages in the Lost River subwatershed (Refer to Standard Tables 5 and 6 for flood damage reduction amounts). The drainage areas, located upstream of the structures, are considered controlled; because, the discharges from the drainage areas are impacted by the performance of the dam structures. The peak runoff from the drainage areas that flow to the dam structures are greater than the flow discharging from the dam structures, and thus are reduced. Therefore the amount of flooding downstream of the dams are reduced. Damage to homes, businesses, roads, bridges, and agricultural property will be reduced. There will be increased agricultural productivity and enhanced quality of life because flooding will be reduced.

#### No Action Future Without Project Alternative

There will be no further reduction in flooding without the installation of Site 16. Flooding at the current level will continue or slightly increase as the upland areas of the Lost River watershed are potentially developed, resulting in more impervious surfaces. Economic damages to agricultural properties, residences, and transportation corridors will continue at the present level. There will be no further improvement to human health and safety and quality of life as it relates to reduced threat of flooding.

### ***Public Health and Safety***

#### Existing Conditions

The installation of 3 flood prevention structures has improved public health and safety by reducing flooding in the watershed. Public health and safety is also improved by providing a dependable raw water supply.



### Alternative 1

Alternative 1 will further improve human health and safety by providing additional flood damage reduction in the watershed. Dependable, long-term water supplies will be available at Site 16, coupled with the existing water supply at Site 10. There will be reduced risk to life and property with construction of Site 16.

### No Action Future Without Project Alternative

Under this alternative, Site 16 would not be developed. There would be no further reduction in flooding and no further improvement in the health and safety of residents who may be at risk due to flooding. There would be no further reduction of flooding to transportation corridors in the watershed and no further improvement in human health and safety related to this concern. In addition, there would be no further health benefits to be gained from additional available water supply.

### ***Water Supply***

#### Existing Conditions

Water supply has become an important resource concern since the inception of the 1974 Lost River Subwatershed Plan – FEIS. The current demand for water supply is discussed in detail in the “Need for Supplement” section and in supporting documentation included in Appendix E. Supplement #3 to the 1974 Work Plan – FEIS also discussed the need for water supply. All the entities in the watershed - residents, farmers, businesses, Lost River State Park, and schools – currently rely on ground water or springs for water supply sources. Although Lost River Site 10

was modified to include 400-acre feet of dedicated rural water supply, the water treatment and distribution system for this supply is planned but not yet in place.

#### Alternative 1

In conjunction with the existing water supply available at Lost River Site 10, Alternative 1 will provide an additional 400 acre-feet of rural water supply (safe yield analysis of 700,000 gpd ) for the needs of current and future residents of the watershed (Refer to the Water Supply Report in Appendix E). Economic and agricultural activities will be enhanced with a more dependable water supply. Adequate infrastructure in the form of a dependable rural water system will allow better community planning and growth. An assured water supply will create the opportunity for industrial growth in the Lost River Subwatershed. Water sampling information indicates suitable water quality for a public water supply. Water test results are displayed in Appendix D.

#### No Action Future Without Project Alternative

Water supply demands will continue to increase in the future, even without the construction of Site 16. There will be increased pressure on groundwater resources as private wells are used for future development. There may be unregulated withdrawals from surface waters, especially under drought conditions, reducing the surface water quantities to levels that could harm fish and wildlife. The detrimental effects of water shortages and droughts will continue without additional source water development to address future needs. In the long term, economic development will be hampered by lack of dependable water supplies. With the no action alternative, no additional rural water supply will be provided.

## ***Soil Erosion and Sedimentation***

### **Existing Conditions**

As part of the original Lost River Subwatershed project, 95,708 acres of land treatment measures have been applied as part of the Lost River Subwatershed Project. These treatments have reduced erosion and sediment from upland areas of the watershed. However, sediment loads in the Lost River mainstem remain high and contribute to river instability. An aerial survey made in November 2004 (Cremann, et.al. 2005) documented 32,773 linear feet of severely eroding streambank along the main stem Lost River, as well as 6,801 linear feet impaired by bulldozer activity.

### **Alternative 1**

Site 16 will trap sediment from the 11.88 square miles of drainage area upstream of the Site 16 structure. Additional sediment is already being captured from the respective drainage areas of Sites 4, 10 and 27. In total, all four structures capture sediment from the 55 square miles of drainage area controlled. Because most of the land cover above the proposed Lower Cove Run impoundment is forested, sedimentation from upland sources is believed to be minor. Eroding streambanks, particularly in the downstream portions of Lower Cove Run, appear to be the primary source of sediment. Sediment loads and turbidity downstream of the proposed embankment will be reduced by the installation of Site 16. In order to avoid or minimize the potential effects of discharging relatively sediment-free water from the impoundment, grade control will be installed below the outlet to dissipate energy and to prevent channel down-cutting in the lower reach of Lower Cove Run.

A reduction in sediment transported to Lost River from Lower Cove Run is not expected to result in any substantial affect to sediment loads presently existing in this river system. Pulses of sediment are delivered to Lost River from most of its tributaries during flood conditions. The containment of sediment within the Site 16 reservoir will only reduce the amount of sediment delivered to Lost River, not eliminate it. Stream stability in Lost River is not expected to be adversely affected by this sediment reduction.

A temporary increase in erosion and sedimentation may occur during construction of the project on Lower Cove Run. However, these adverse effects of construction will be minimized by the implementation of best management practices (BMPs) at the site.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed. Sediment originating from the 11.88 square mile upstream drainage of Lower Cove Run would not be contained. Excessive sediment from eroding streambanks in the downstream portion of Lower Cove Run would not be reduced and it would be transported to the Lost River main stem. There would also be no reduction in sediment deposition upon meadows and cropland, damage to crops, fertility losses and other impacts to farm productivity associated with unabated flooding. Aquatic habitat and water quality improvements from reduced turbidity and suspended sediment downstream of the proposed Lower Cove Run project would not be realized.

## ***Agricultural Productivity***

### Existing Conditions

Agricultural productivity along the Lost River floodplain has been improved with the installation of 3 dams and the land treatment program. Reduced flooding on agricultural lands has improved crop yields by limiting the frequency of flooding and the degree of inundation. The three existing impoundments required 416 acres of private land to be converted to public uses, including 35 acres of prime farmland. Tables 5 and 6 show the monetary benefits associated with improved agricultural productivity.

### Alternative 1

Alternative 1 will further enhance agricultural productivity by reducing erosion, sedimentation, and flooding in the watershed. The installation of Site 16 will further improve the productivity of hayland and cropland in the Lost River floodplain by reducing the magnitude and frequency of flooding. With less flooding, repairs to fencing and other farming infrastructure will be required less often. Farm incomes will be further improved. Approximately 222.5 acres of private land will be converted to public uses, including 27.9 acres of prime farmland. There is no agricultural production on Forest Service lands impacted by the project so there are no effects with regard to this resource concern on Forest Service property.

### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed. Agricultural productivity would continue at current levels as there would be no additional reduction of flood elevations on

the Lost River floodplain. The 222.5 acres of privately owned land along Lower Cove Run, including 27.9 acres of prime farmland, would remain in private ownership.

### ***Prime and Unique Farmland***

#### **Existing Conditions**

The effects upon prime and unique farmland resulting from the installation of the three existing structural sites were addressed in the supplemental reports prepared prior to the installation of those sites. No prime farmland soils were identified for areas utilized for Sites 10 and 27. Thirty-five acres of prime farmland soils were identified within the area utilized for Site 4.

#### **Alternative 1**

The project area under consideration for Site 16 is comprised of 234.4 acres of land. About 222.5 acres of this land is in private ownership and about 11.9 acres are already in public ownership by the US Forest Service. Nearly all of the private portion of land in the project area is utilized for agricultural uses. These uses include grassland production on hayland and pasture to support raising beef cattle and horses. Some of this acreage is used as cropland. Three residences (homesteads) are within the proposed project boundary.

Of the total 222.5 private acres, about 27.9 acres are classified as prime farmland (See Farmland Map, Appendix B). No soil mapping units have been officially designated as statewide important farmland or locally important farmland for Hardy County. None of the US Forest Service land in the proposed project area is classified as prime farmland.

Under this alternative, approximately 222.5 acres of private land would be placed in public ownership for the implementation of the Site 16 project. As a result, 27.9 acres of prime farmland would be removed from agricultural production due to the implementation of Site 16.

Flowage easements amounting to about 43.6 acres below the auxiliary spillway would be needed in the event water from the impoundment discharges through that outlet. Agricultural activities would not be restricted on this acreage with the exception that homes, barns, storage sheds or other like improvements would not be permitted within the flowage easement area. Refer to the Important Farmland map in Appendix B for more information.

#### No Action Future Without Project Alternative

Under this alternative, Site 16 would not be developed. The 222.5 acres of private land would remain in private ownership. About 27.9 acres of prime farmland would remain available for agricultural uses. This alternative would also eliminate the need for approximately 43.6 acres of flowage easement below the auxiliary spillway.

### ***Land Use and Upland Habitat***

#### Existing Conditions

The effects of constructing Sites 4, 10, and 27 upon land use and upland wildlife habitats were evaluated in the supplemental reports generated prior to the installation of these projects. These three structural sites involved approximately 416 acres of land. Agricultural uses on these acres were eliminated. Upland wildlife habitat on the 107.1 acres permanently inundated was converted to aquatic and riparian habitats. This area included 23.3 acres of forestland, 64.5 acres

of pastureland and 9.0 acres of cropland (hayland). An additional 104.3 acres were utilized for the construction of dams, auxiliary spillways and appurtenances associated with these sites. Approximately 64.7 acres of forestland, 32.6 acres of pasture, and 6.5 acres of cropland (hayland) were degraded or eliminated as upland wildlife habitat.

Supplemental plantings and the creation of brush piles adjacent to the dams, spillways and borrow areas were made to diversify habitats and reduce the adverse effects of the project construction. Other habitat strategies, including leaving trees and brushy areas in place and allowing hayland and pastureland areas to grow up, were implemented to minimize impacts. These habitat enhancements were selected in consultation with the WVDNR.

In addition to the 211.4 acres utilized for the dams, spillways and permanent pool areas for the three sites, about 186 additional acres were contained within the floodwater detention areas. Areas to be temporarily inundated by floodwater storage for Sites 10 and 27 included 20.4 acres of pastureland, 13.5 acres of hayland and 14.4 acres of forestland. Land use for the 135 acres of flood storage pool for Site 4 was not specified. Upland habitat quality was not adversely affected on the flood storage pool areas subjected to temporary inundation.

#### Alternative 1

***Note:** The 231.5 acre project area for Site 16, as reported in the first Draft EIS (September 2006), was initially estimated from aerial photographs and Geographic Information Systems (GIS). Properties within the project area were surveyed during the spring of 2008. This survey revealed that the Site 16 project site contains a total of 234.4 acres. Because of the small*



*difference between the estimated and measured acreage within the project area, the original acreages when broken down by land use categories, farmland and habitat types , as used throughout this second draft document, are based upon the original estimated total of 231.5 acres.*

Land use and upland habitat for the proposed Site 16 project area is comprised of 81.0 acres of forestland, 107.4 acres of pastureland, 41.2 acres of hayland (cropland), and 1.8 acres of farmstead (See “Land Use – Cover Type” map, Appendix B). The 11.9 acre portion of the project area on US Forest Service lands is forested. Agricultural uses on the 222.5 acres of private land would be eliminated. Upland wildlife habitat on 46.6 acres will be permanently flooded and converted to aquatic and riparian habitats. This area is comprised of 19.3 acres of woodland, 13.9 acres of hayland (cropland) and 11.0 acres of pasture. The 2.4 acre (hayland, pastureland, and woodland) difference is a result of the overlap of permanent pool area and the footprint of the dam structure. An additional 40.2 acres will be utilized for the construction of the dam and auxiliary spillway structures. This area is currently comprised of 9.3 acres of woodland, 23.2 acres of pastureland and 7.7 acres of hayland.

In addition to the areas to be utilized for the dam, spillway and permanent pool, an additional 40.2 acres will be periodically inundated by the floodwater retention pool. This area is comprised of 17.4 acres of woodland, 12.2 acres of hayland, 10.4 acres of pastureland and 1.6 acres of farmstead. The difference in acreages is a result of area overlap for the auxiliary spillway and the flood retention pool.

Areas to be utilized for the construction of the dam, auxiliary spillway and the associated borrow areas will permanently alter the existing upland habitats. The dam, spillway and borrow areas, not permanently inundated, will be revegetated with grass and legume seed mixtures.

Supplemental plantings of trees and shrubs, where they will not interfere with the function of these structures, will be made to diversify habitat. Forestland will be cleared within the permanently inundated area in order to minimize the collection of woody debris around the outlet structure of the dam. Tree stumps and vertical stems along Lower Cove Run upstream of the embankment will be left in place to provide cover for fish and other aquatic species. A selection of tree tops and other woody materials removed from the dam and permanent pool areas will be anchored in the upper end of the permanent pool for fish cover. Brush piles or windrows will be placed above the floodpool to provide cover for terrestrial species. Additional information regarding mitigation for adverse impacts to upland wildlife habitat can be found in the Mitigation Summary section provided in the Recommended Alternative section of this document.

Upland areas to be subjected to temporary inundation for floodwater retention will not be appreciably impacted by the temporary flooding. Woody vegetation in the flood storage pool areas that are not utilized for construction activities will be left in place. Flood storage pool areas, which are presently in grassland uses, will be allowed to evolve through natural vegetative succession or will be enhanced by artificial plantings of tree or shrub species. Habitat enhancements associated with the Site 16 project will be coordinated with the WVDNR and the USFWS.

Some tree removal is planned for the US Forest Service land that will be permanently inundated. The majority of the 11.9 acre Forest Service land in the floodwater retention pool will remain forested. Refer to the “Land Use – Cover Type” map in Appendix B for more information.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be developed. Land use and vegetative cover on the 234.4 acres identified for the project, including the 11.9 acres of Forest Service land, would not be altered and would remain in uses similar to those described under existing conditions.

#### ***Aquatic Resources***

##### Existing Conditions

Aquatic resources were evaluated in the supplemental documents prepared prior to the implementation of the three existing sites. The three completed sites converted 10,220 linear feet of perennial stream, amounting to approximately 4.7 acres, to 107.1 acres of permanent lake habitat. The stream resources originally supported populations of native non-game fish species. Kimsey Run (Site 4) also supported populations of smallmouth bass and rock bass. Trout were also stocked in Kimsey Run four times per year by the WVDNR to maintain a put and take trout fishery.

The 107.1 acres of permanent lake habitat are managed by WVDNR as warm-water largemouth bass and bluegill fisheries. The Kimsey Run (Site 4) impoundment is also stocked with crappie and channel catfish and receives trout stocking every two weeks from February through May.

Site 10, at Parker Hollow, has received habitat enhancements designed to create an “exceptional channel catfish” fishery at that impoundment. Site 10 and Site 27 also have the potential to receive trout stockings in the future if fisherman demand exists and hatchery produced fish are available. Public access is permitted at each of these impoundments.

Aquatic invertebrates collected from the converted stream reaches prior to constructing the three impoundments included dragonfly, stonefly, mayfly, caddisfly, snail and crayfish species.

Following the completion of these impoundments, there has been a shift from species dependant upon perennial stream habitats to those adapted to survival in lake environments.

#### Alternative 1

An evaluation of the fishery resources for Lower Cove Run was conducted on April 25, 2005, by the WVDNR (See Appendix D). A 100 meter (328 feet) segment of the stream, in the location of the proposed embankment, was sampled using triple pass backpack electrofishing methodology. Fish species collected included brook trout, central stoneroller, mottled sculpin, greenside darter, fantail darter, blacknose dace and longnose dace. A total of 985 individual fish were collected during this survey. Only three individuals of the total sample were brook trout. The total estimated standing stock of the 100 meter reach sampled was 3.785 Kg (8.36 lbs). Brook trout comprised 0.004 Kg (0.009 lb) of the estimated standing stock. Portions of Lower Cove Run upstream of the project area are stocked with trout by the WVDNR. The stream receives one trout stocking per month from February through May. Fishing access is limited on the privately owned portion of the stream.

The small number of young-of-the-year brook trout collected during the April 2005 fish survey suggests that this species may have reproduced in Lower Cove Run. The discussion in the 2005 survey indicated that a fishery survey conducted on Lower Cove Run by the US Forest Service in 1965 resulted in no trout species being observed. Following this survey, 76 pounds of brook trout were released in March 1965 and in May of that same year 61 pounds of rainbow trout were stocked. The WVDNR conducted an electrofishing survey on Lower Cove Run on October 10, 1973, about one mile upstream from the mouth. No trout were observed during this survey; however, smallmouth bass and rockbass were collected. The presence of smallmouth bass and rockbass may suggest that water temperature (68 degrees F.), at the time of this survey, was higher than that usually inhabited by trout species (about 62 degrees F. or cooler). This assumption; however, can not be substantiated as WVDNR has occasionally found the bass and trout species both within a single survey. It is not known if the young-of-the-year brook trout observed in the 2005 survey originated from a remnant native population, are offspring from the 1965 stocking or from stockings that were made by WVDNR on Forest Service lands in more recent years.

It is also not known if the brook trout population in Lower Cove Run is presently isolated from other potentially self-sustaining populations of brook trout that may inhabit other Lost River tributaries. The distance between these local populations may inhibit the movement of this species from one tributary to another. Low flows and elevated water temperatures during summer may also prevent individuals from moving between suitable habitats in the cooler upper reaches of tributary streams. Cooler temperatures and higher flows during winter may be conducive to brook trout movement in, out and between suitable tributary habitats. The

construction of the proposed Site 16 impoundment would result in a barrier to fish movement between the upper reaches of Lower Cove Run and the lower sections of this stream and the main stem Lost River.

Rapid Bioassessment Protocol data were collected by the US Forest Service in April 2002 and March 1995 (Appendix D). Dominant aquatic invertebrates represented in the 2002 dataset include mayflies, fishflies, midges, stoneflies and caddisflies. Dominant invertebrates in the 1995 survey were mayflies and midges. The Macroinvertebrate Aggregated Index for Streams (MAIS) was 17 (very good) for the 1995 survey and 18 (very good) for the 2002 survey.

Under this alternative, about 3,040 linear feet of Lower Cove Run would be displaced by the dam and permanent impoundment. About 1.40 acres of perennial stream would be replaced with a 46.6 acre warm water impoundment. This portion of the stream will be permanently inundated; however, the warm water impoundment will be conducive to the establishment of a bass and bluegill fishery with emphasis on creating an exceptional channel catfish waters. Habitat enhancements for channel catfish will be coordinated by WVDNR fishery biologists. It is possible that a seasonal spring trout stocking program will also be initiated if fisherman demand and availability of hatchery raised trout are adequate. The impoundment's fishery will be stocked and managed for public access by the WVDNR. It is estimated that 7,456 angler days of recreation will be provided annually once the fishery is established.

Aquatic invertebrate populations will shift from those adapted to cold water perennial stream habitats to those favoring warm water lentic habitats. Additional information regarding

mitigation for adverse impacts to aquatic resources and fisheries can be found in the Mitigation Summary provided in the Recommended Alternative section of this document.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed. The 46.6 acre impoundment would not be created and there would not be an opportunity to create a warm water bass and bluegill fishery or to create an exceptional channel catfish fishery. About 1.40 acres of cold water perennial stream, comprised of about 3,040 linear feet, would not be converted to a permanent warm water impoundment. Native fish populations in Lower Cove Run, including the brook trout, would not be further isolated from the Lost River drainage as a result of the construction of the impoundment. Aquatic invertebrate species adapted to perennial cold water streams would remain as the dominant populations in Lower Cove Run.

### ***Recreation***

#### Existing Conditions

Several recreational facilities have been added in or near the Lost River Subwatershed since the 1974 Work Plan – FEIS was developed. The US Forest Service offers fishing, boating, swimming, camping, picnicking, and other activities at the Trout Pond Recreation Area in George Washington National Forest. Additionally, Lost River State Park has many amenities for residents and tourists, including a swimming pool, cabins, horseback riding, playgrounds, and camp sites. Also, recreational opportunities are available at Warden Lake. There continues to be a high demand for fishing in the area, as is evident by the fishing pressure at Lost River Sites 4 and 27. It is expected that there will be intensive use of the lake at Site 10 once the fishery there

is established. WVDNR continues to invest in these fisheries in the form of fish stocking, fishery management and the maintenance of public access. Other than fishing, existing developed recreational facilities in or near the watershed appear to be sufficient to meet the recreational demand.

#### Alternative 1

Alternative 1 eliminates the developed recreational purpose originally associated with Site 16. Existing developed recreational facilities in or near the watershed duplicate many of those originally proposed for development at Site 16. Recreational features to be eliminated include a campground, picnic areas, picnic shelters, access roads and parking areas, playground, swimming beach, sanitary facilities and waste water treatment. Amenities associated with fishing, such as boat launching ramp (non-motorized or electric motors only) and parking, will remain a part of the Site 16 proposal. The elimination of the developed recreation components will reduce the amount of Forest Service and private land required to implement these measures. Also, there will not be competition between the Forest Service, state and private recreational amenities and those initially proposed as part of the Lost River Subwatershed Project. It is estimated that 7,456 angular-days of fishing recreation will be provided annually once the Site 16 fishery is established. Visitation for other types of incidental recreation at Site 16, such as bird watching, hiking and boating, was not estimated.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed. The 46.6 acre permanent impoundment would not be created and the opportunity for 7,456 annual angular-days of fishing



recreation would not be realized. Limited fishing opportunities would remain on the existing perennial stream at the Lower Cove Run site.

### ***Riparian Areas***

#### Existing Conditions

Riparian habitat was described in the supplemental environmental documents prepared prior to the implementation of Sites 4, 10 and 27. Riparian areas affected by these sites were mostly forested with deciduous tree species. A total of 10,220 linear feet of perennial streams were converted to dam structures and permanent flat water impoundments. Riparian zones associated with these impacted streams were estimated to be 20,440 linear feet in length. These riparian areas were converted to 107.1 acres of flat water environment with a shoreline length of 23,750 feet. Shoreline vegetation was left intact where possible and was allowed to succeed through natural processes. Stock piled wetland topsoil was distributed in the shallow water areas of permanent pools to enhance the rapid re-establishment of wetland vegetative species.

#### Alternative 1

Riparian zones along both sides of Lower Cove Run are mostly forested. The forest cover is dominated by deciduous tree species with scattered conifers and eastern red cedar. The area in the upper portion of the stream in the project area is well shaded by the tree canopy and the streambanks sustain good cover comprised of tree roots, woody debris, boulders and large cobble and undercut banks. In the lower portion of the project area, Lower Cove Run riparian cover has a less dense canopy and an abundance of multiflora rose bushes in the vegetative understory. Streambank erosion is more prevalent in that area and sediment bars, comprised of large cobble

and gravel, separate the normal stream channel and the floodplain. Cattle have access to the stream throughout the entire lower portion of the project area reach.

Under this alternative, about 3,040 linear feet of Lower Cove Run would be impacted by the construction of the dam, the permanent pool, and the principal spillway outlet. Approximately 6,080 linear feet of riparian habitat would be altered by Site 16 installation. All trees in the area of the dam site would be removed to facilitate construction. All trees upstream of the dam and auxiliary spillway, within the permanent pool of the impoundment, will be cut and removed from the permanent pool area. This clearing is necessary to eliminate trees and floating debris from collecting around the riser (outlet structure) and interfering with its function. In the area upstream of the embankment, stumps and the lower portion of vertical stems will be left in place for habitat enhancement. The severed portions of some trees will be strategically anchored in the pool area for fish cover and others will be used for the construction of brush pile habitat on upland areas above the flood pool. The approximately 825 feet of Lower Cove Run between the principal spillway outlet and the lower project property boundary will have enhanced riparian vegetation because cattle will no longer have access to the stream and streambanks in that area.

Once the permanent pool of the impoundment is filled, about 6,840 feet of lake shoreline will be created. This area does not include the 1,450 feet of permanent pool shoreline across the upstream face of the dam. Forested areas above the permanent pool will not be removed except where necessary to facilitate construction or for the excavation of borrow material.

### No Action Future Without Project Alternative

Under this alternative, no riparian habitat along 3,040 linear feet of Lower Cove Run would be altered as a result of the implementation of Site 16. No tree removal would occur to reduce the hazard of floating debris interfering with the operation of the principal spillway structure. Cattle would continue to have access to Lower Cove Run, and the riparian areas adjacent to it, on the privately owned land in the project area. Lake shoreline totaling approximately 8,290 feet, and riparian areas associated with the impoundment, would not be created. Existing conditions on the 11.9 acres of National Forest System lands would be maintained.

### ***Wetlands***

#### Existing conditions

The effects of implementing the three existing impoundments upon wetlands were addressed in the respective environmental documents for each site. Wetlands of 0.11 acres, 0.20 acres and 0.08 acres were delineated for Sites 4, 10 and 27, respectively. Wetland losses were offset by the shallow water areas created in the upstream ends of the permanent pools associated with each impoundment. Topsoil layers of impacted wetlands at Site 10 were salvaged and applied to shallow water areas in the permanent pool to enhance the establishment of wetland vegetation.

#### Alternative 1

The First Draft EIS released in 2006 estimated potential wetlands within the proposed Site 16 project area using hydric soils mapping units as an indicator. Approximately 29.55 acres of hydric soils mapping units were identified within the project area (See Appendix B – Soils Maps and Soils Descriptions).

Wetlands delineation on the 234.4 acre Lower Cove Run Site was completed in October 2007 (See Appendix D - Wetland Delineation Report). Wetland delineations were performed using the procedures and methodologies outlined in the U S Army Corps of Engineers Wetlands Delineation Manual – Technical Report Y-87-1 (January 1987). A total of 25.65 acres of wetlands were delineated within the proposed Site 16 project area. These wetlands were contained within eight areas and comprised three geomorphic settings, including: bottomland, abandoned stream meanders and hillside seeps (See Wetland Delineation map – Appendix B, and Tabulation 3).

**TABULATION 3. WETLAND AREAS DELINEATED.**

**REFER TO THE MAP ENTITLED “WETLAND DELINEATION”.**

<b>GEOMORPHIC SETTING</b>	<b>WETLANDS</b>	<b>AREA DELINEATED (acres)</b>	<b>TOTAL (acres)</b>
Bottomland	Area 1	24.53	24.53
Abandoned Stream Meanders	Area 2	0.20	0.93
	Area 3	0.04	
	Area 4	0.02	
	Area 5	0.01	
	Area 6	0.66	
Hillside Seeps	Area 7	0.17	0.43
	Area 8	0.26	
Artificial Wetlands (Ponds for Livestock water)	AW	0.22	---
<b>TOTAL</b>		<b>25.87</b>	<b>25.65*</b>

*\* Note that the total does not include the 0.22 acres of artificial wetlands (AW)*

The footprint (base) of the embankment will cover an area of about 16.97 acres. Of this area, approximately 2.17 acres of farmed jurisdictional wetland will be filled. An additional 0.5 acre of farmed jurisdictional wetland below the proposed embankment will be disturbed during

construction. A new outlet channel, to be constructed between the impact basin below the dam and the existing Lower Cove Run channel will impact 0.01 acre of non-jurisdictional wetland.

The total wetland area to be impacted by the embankment will be 2.68 acres.

A 46.6 acre permanent impoundment will be created upstream of the embankment. The permanent pool of this impoundment will inundate 12.68 acres of jurisdictional wetland (farmed) and 0.66 acres of non-jurisdictional wetland. The total wetland area inundated by the 46.6 acre permanent impoundment will be 13.34 acres.

A total of 16.02 acres of wetland will be impacted by the construction of the embankment and the creation of the 46.6 acre permanent impoundment. Of this total, 15.35 acres are jurisdictional wetlands and 0.67 acres are non-jurisdictional.

In addition, there are areas of wetlands that appear to exist in the area immediately below the proposed auxiliary spillway (43.6 acre flowage easement). These areas were not delineated as no construction is proposed for that area.

In the event that additional fill is required, additional wetland resources may be impacted (See 'Project Map with Wetlands and Potential Borrow Areas' in Appendix B). Any additional wetlands impacted will be added to the total indicated and the Compensatory Mitigation Plan (Proposed) will be amended as appropriate.

**NOTE:** *A Jurisdictional Determination (JD) field review was conducted on July 23, 2008 by COE (Pittsburgh district), USEPA and NRCS personnel. The JD report has not yet been received by permit applicants. References to jurisdictional and non-jurisdictional wetlands and waters are based upon conversations held in the field during the JD review. Drainage swales, ditches and other similar features (other than Lower Cove Run) were either included within delineated wetlands or were determined to be non-jurisdictional.*

A review of historical aerial photography of the Site 16 project area indicated that the site had:

1. Been in continuous agricultural land use (cropping, haying and grazing) since at least the 1930s and more likely since before 1900; and
2. The hydrology has been removed, diverted or otherwise altered via the use of bedding systems, culverts, diversions and drainage ditches.

Therefore, most areas described in the delineation report were evaluated using the “**Atypical Situation**” where “**Normal Circumstances**” did not exist.

The wetland areas delineated have had significant disturbance over a long period of time, have remained in agriculture production and have not been abandoned. Although these areas still exhibit the basic wetland parameters as described in the delineation document, the functionality of these areas is minimal at best. Due to the historical and current management practices, landuse, the alteration of natural hydrologic regimes, and the removal of vegetative communities, these wetland areas provide very little functionality in terms of wildlife value, water quality,

flood storage or groundwater recharge. The restoration of any functionality to these wetlands would require the removal of fill, filling of ditches and cessation of current management.

It is estimated that about one acre of the upper, shallow end of the permanent impoundment will have a depth of one foot or less. An additional one acre, or slightly larger area, will be one foot or less above the permanent pool elevation in the upper end. The wetlands currently impacted by the previously installed surface drainage and the areas slightly higher than the permanent pool elevation will be enhanced by the higher water tables that will result from the impoundment. Additional enhancements, in the form of constructed wetlands and measures to improve the functionality of existing wetlands that will be avoided in the project activities, will be installed to mitigate wetland impacts that will result from the construction of the embankment and reservoir. Impacted wetlands with remnant wetland vegetation will have the topsoil layers removed and stockpiled. This topsoil and the associated plant matter and seed content will be distributed in shallow water areas of the impoundment and in constructed wetlands to facilitate the rapid re-establishment of wetland vegetation. Topsoil from impacted wetland areas exhibiting atypical vegetation will not be incorporated into constructed wetlands to minimize opportunities for the establishment of non-native wetland vegetative communities.

Unavoidable adverse impacts to the 16.02 acres of delineated wetlands will be mitigated on the project site by constructing wetlands and enhancing unaffected wetlands in the areas below the embankment and upstream of the 46.6 acre impoundment. Mitigation for wetland impacts will be implemented at a 1:1 ratio. A 1:1 ratio is proposed because of the poor functionality of the existing wetland conditions. In the event that wetland mitigation cannot be totally accomplished

within the Site 16 project area, potential exists for implementing wetland mitigation measures on the Edwards Run Wildlife Management Area. This state owned area is located in Hampshire County about two miles north of Capon Bridge.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed and the delineated wetlands within the Lower Cove Run site would not be altered by the proposed project. Land use, consisting primarily of agricultural grassland production for cattle and horses, would likely continue. Land management practices, including the maintenance of surface drainage systems, would continue to reduce wetland hydrologic functions.

#### ***Waters of the US***

##### Existing Conditions

The individual affects of the three existing impoundments, upon the waters of the US, were addressed in the respective environmental documents for each site. Cumulatively, the dam structures and reservoir pools permanently impacted 10,220 feet (1.94 miles) of perennial streams in the watershed. The impoundments at Sites 4, 10 and 27 total 107.1 acres of permanent pool area. Additionally, approximately 12,430 feet (2.35 miles) of perennial streams were subject to periodic inundation in the flood storage pools.

##### Alternative 1

Approximately 6,100 linear feet of Lower Cove Run lies within the proposed Site 16 project limits. Lower Cove Run is a perennial cold water stream that is 4.6 miles long and drains an area



of 11.88 square miles. Lower Cove Run is 12 to 30 feet wide through the project area and has an average depth of 12 to 18 inches under normal flow conditions.

Under this alternative, approximately 3,040 linear feet (0.58 miles) of Lower Cove Run would be displaced by the dam structure and permanent impoundment. Of this total, 2,290 feet would be converted from perennial stream to a 46.6 acre permanent impoundment. About 570 linear feet of the stream would be diverted through the dam structure's principal spillway conduit. An additional 180 feet of the stream below the dam would be replaced by an equal length of rock-lined outlet channel. Upstream of the permanent impoundment, about 1,425 feet of Lower Cove Run (between the permanent pool elevation and the auxiliary spillway crest elevation) would be subjected to periodic inundation by the 100-year flood storage pool. An additional 810 feet of the stream (between the auxiliary spillway crest and top of dam elevation) may be subject to infrequent inundation; however, this flooding is not expected to differ from the normal out-of-bank flooding resulting from high flows on this reach of the stream. About 825 feet of Lower Cove Run lies between the principal spillway outlet and the proposed downstream limits of the project.

Other drainage swales and ditches within the Lower Cove Run project area were either included within the delineated wetland areas or were determined to be non-jurisdictional waters.

#### No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed. Approximately 3,040 linear feet of Lower Cove Run would not be altered by the construction of the dam and 46.6 acre

impoundment. An additional 1,425 linear feet of Lower Cove Run would not be subjected to temporary inundation as a result of floodwater detention.

### ***Water Quality***

#### **Existing Conditions**

The Lost River Watershed was added to the West Virginia 303(d) list of water quality impaired waterbodies for fecal coliform bacteria in 1996 (US EPA 1998). This listing was the result of fecal coliform bacteria levels exceeding the maximum allowable standard of 200 colonies per 100 milliliters for samples collected in the Lost River Watershed. Accordingly, Total Maximum Daily Loads (TMDLs) were developed in 1998 to establish allowable loadings to reduce pollution from both point and non-point sources in order to restore and maintain the quality of this water resource. The non-point source model developed in conjunction with this TMDL indicated that water quality standards will be achieved if fecal coliform loads are reduced by an average of 33.4 percent throughout the watershed. This average was comprised of reductions of 38.3 percent from pastureland, 12.8 percent from forestland and 37.8 percent from cropland.

Water quality data from the USGS gage station at McCauley (station number 01610200) was obtained from the internet site <http://nwis.waterdata.usgs.gov/nwis/gwdata>. Data for a variety of parameters exists for the period of record from January 1972 through August 1995. No records were posted for water quality after 1995. Since the existing Lost River dams were completed in 1996, 1998, and 2005, no water quality data from this station were available to show if the three impoundments affected water quality at the McCauley site.

Water quality testing was performed by the US Geological Survey from October 1988 to July 1989. These water samples were collected from the same tributary streams and the upper Lost River main stem as were the early 1970 samples (1974 FEIS). Average water quality values were listed in the 1990 Lost River Supplemental Information Report as: pH 6.7, dissolved oxygen 11.2 mg/l and hardness 37.1 mg/l.

In February 1994, water quality on Upper Cove Run was tested using field methods. These data revealed a pH of 7.1, temperature of 4.3 degrees Centigrade and dissolved oxygen of 13.1 mg/l. Camp Branch of Bakers Run was sampled on May 25, 2000, by NRCS personnel and analyzed by a commercial laboratory. Data for the Camp Branch laboratory analyses is contained in Appendix D.

The accelerated land treatment measures applied within the Lost River drainage have improved land cover and hydrologic conditions resulting in reduced runoff and erosion from treated areas. The conservation practices have helped limit water quality degradation by reducing nutrient and fecal coliform loading from agricultural sources within the watershed.

#### Alternative 1

Water quality data specific to Lower Cove Run were obtained from several sources. The US Forest Service provided water quality data collected in 1990, 1991, 1992, 1995 and 2002. The WV DEP provided water sample results collected in June 2000. Most recently, samples from Lower Cove Run above and below the proposed project site were collected January 2006 by the WV Department of Agriculture. The results of these analyses indicate good water quality in Lower Cove Run. The results of the water quality testing are contained in Appendix D.

The TMDL for fecal coliform in the Lost River (USEPA 1998) indicated that no study samples from Lower Cove Run exceeded the West Virginia water quality standards for these bacteria. The implementation of Site 16 would result in the removal of about 20 head of cattle and a limited number of horses from pastureland within the proposed project area. The removal of this livestock from the fields adjacent to Lower Cove Run will have the potential to reduce coliform bacteria loading to Lost River as specified in the 1998 TMDL. Coliform bacteria from upland wildlife populations in the Lower Cove Run drainage area, including the National Forest System lands, are not expected to change. The presence of Canada Geese, should they establish residence on the proposed Site 16 impoundment, could offset the reduced coliform bacteria loading that may result from the removal of livestock along Lower Cove Run.

The creation of the 46.6 acre permanent lake on Lower Cove Run would result in increased temperatures in the impounded lake water. The 1974 FEIS estimated that surface water temperatures may increase 5 to 10 degrees F. above the normal stream temperatures in late summer. The WVDNR collected temperature data at various elevations within the impoundments at Kimsey Run (Site 4) and Parker Hollow (Site 10) in August and September 2006 (See Appendix D). Cold water releases were installed at Kimsey Run and Parker Hollow at 11 feet (3.35 meters) and 16.5 feet (5 meters), respectively, below the normal water surface elevations of these impoundments. Temperatures at Kimsey Run were about 6 degrees C (10.4 degrees F) cooler in August and less than 1 degree C (1.2 degrees F) cooler in September when compared to surface water temperatures. Temperatures recorded at Parker Hollow were 9.8 degrees C (17.6 degrees F) and 7 degrees C (12.6 degrees F) cooler than surface temperatures for

August and September, respectively. No temperatures upstream or downstream of the impoundments were measured.

To avoid adverse temperature impacts to the fishery downstream of Site 16, a cold water release in the principal spillway structure will be included with the riser configuration. Based on the WVDNR temperature data, the cold water release should have its crest approximately 4 meters (13 feet) below the proposed surface elevation of Site 16. This elevation would have the potential of reducing temperatures of discharges from 5.3 degrees C (9.5 degrees F) and 11.5 degrees C (20 degrees F) below that of a surface-only discharge during late summer.

The accumulation of nutrients in the impoundment is not expected to pose a management problem. Forest litter, comprised of leaves and other vegetative matter, will provide the greatest source of organic material to the impoundment. Nutrient sources from agricultural activities or from human habitation in the Lower Cove Run watershed above the impoundment are negligible. Dissolved oxygen levels in the released water will approach saturation levels as a result of aeration through the principal spillway system. Dissolved oxygen (DO) data collected at the Kimsey Run and Parker Hollow impoundments in August and September 2006 (Appendix D) showed considerable decreases in DO concentrations between surface readings and those taken at a depth of 3 to 4 meters (10 to 13 feet). DO concentrations approached anoxic levels during August at both sites. During consultations with WVDNR, the fishery biologist indicated that anoxic water readily absorbs oxygen when given an opportunity to be aerated. Based upon this observation WVDNR expressed no concerns that water passing through the lower riser outlet would result in oxygen deficient discharges downstream. Similar results are expected at the Site

16 outlet. As a result of these consultations and the reference site data, it was determined that no DO data needed to be collected upstream or downstream of the two impoundments studied.

#### No Action Future Without Project Alternative

Under this alternative, Site 16 would not be constructed and no water would be impounded on Lower Cove Run. Water temperatures and dissolved oxygen would not be altered and would remain as described in the existing conditions. Organic nutrients from vegetative matter would not accumulate as Lower Cove Run would not be impounded.

#### ***Threatened and Endangered Species***

##### Existing Conditions

Consultations with the USFWS were made prior to completion of the 1974 Work Plan – FEIS and subsequent supplements. No threatened or endangered species are known or expected to be present in the watershed (Refer to USFWS letter in Appendix B). Therefore, no impacts to threatened or endangered species, or to habitats critical to their existence, were identified within the project areas.

Concerns for the endangered plant species Harperella (*Ptilimnium nodosum*), that exists along the Cacapon River more than 50 miles down stream of the Lost River Project, were discussed in the 1990 Supplemental Information Report. It was determined that no adverse effects to this plant species were expected due to the distance it is located down stream.

## Alternative 1

In 2005 consultations with the USFWS were made regarding the proposed Lost River Site 16 project component on Lower Cove Run. The USFWS indicated by letter of August 15, 2005 (Appendix F) that “No federally listed endangered and threatened species are expected to be impacted by the project.” The addition of water supply as a purpose to Site 16 is not expected to impact listed species. No adverse impacts to endangered or threatened species were identified on National Forest System lands.

## No Action Future Without Project Alternative

Under the no action alternative, Site 16 would not be constructed and there would be no adverse impact to any federally listed endangered or threatened species.

## ***Invasive Species***

### Existing Conditions

Invasive species, especially invasive plant species, are of concern in all watersheds. According to the WVDNR website ([www.wvdnr.gov/wildlife/invasivewv.shtm](http://www.wvdnr.gov/wildlife/invasivewv.shtm)), 663 species of non-native invasive plants are found outside cultivation in West Virginia. A variety of invasive plant species already exist in the Lower Cove Run watershed; however, these have not been inventoried. Federal and state natural resource agencies have ongoing programs to monitor invasive species, but no specific information exists on conditions in the Lost River Subwatershed.

### Alternative 1

Implementation of Alternative 1 and any additional land treatment measures will incorporate best management practices to reduce or minimize opportunities for invasive plant species to become further established. Construction areas and other sites with disturbed soils will be reseeded with desirable plant species as quickly as possible, reducing the opportunities for the spread of invasive plant species. Topsoil from impacted wetlands that have a preponderance of atypical or potentially invasive vegetative species will not be incorporated into mitigation wetlands or the shallow reservoir areas in order to minimize opportunities to spread undesirable species. Precautions will be taken to avoid the spread of noxious weeds in accordance with state and federal guidelines.

### No Action Future Without Project Alternative

Under this alternative, Site 16 will not be constructed. Land disturbances associated with project implementation would not occur and opportunities for the introduction or dispersal of invasive plant species would be avoided. There will be no effect upon invasive species without further project action.

## ***Historic, Scientific, and Cultural Resources***

### Existing Conditions

Cultural resource investigations were conducted during the planning stages for Sites 4, 10, and 27. A total of 29 prospective sites were identified during Phase I investigations at these sites. Twenty-one of these sites were studied further through Phase II investigations and two of these sites were investigated under Phase III protocols. Copies of cultural resources investigative



documents pertaining to the three existing project sites were reviewed by the WVSHPO and letters of concurrence with the findings were provided. Also, the 1974 Work Plan – FEIS and subsequent supplements contain detailed discussions of the findings and mitigation activities related to construction of Sites 4, 10, and 27.

### Alternative 1

A cultural resources identification survey (Phase I) of the Site 16 project area was completed in July 2005. A total of eight prehistoric sites, five architectural sites, and 15 isolated finds were located. Consultation with the West Virginia State Historic Preservation Office (WV SHPO) indicated that five prehistoric sites warranted further testing or avoidance. It was determined that one of these five sites could be avoided; however, the other four could not.

After completion of the Phase I Archaeological Survey in 2005, the auxiliary spillway for the Site 16 impoundment was realigned to avoid potential impacts to the embankment that might result from flows through the auxiliary spillway. This realignment involved an area of about 49 acres that was not previously surveyed in the 2005 Archaeological report. In 2008, NRCS contracted to have Phase I investigations conducted on the 49 acres of land affected by the new auxiliary spillway and Phase II investigations on the four sites previously recommended for more detailed study. The second Phase I investigation revealed one new prospective prehistoric site and no new architectural sites. A number of isolated finds were recorded; however, most of these were adjacent to a site that had been found during the initial Phase I study. An additional Phase II site was determined to be outside of the area of potential effect and WVSHPO agreed to eliminate it from the list of sites recommended for Phase II analyses (See letter Appendix F).

Phase II work was completed in September 2008 on the remaining three prehistoric sites recommended for further study. Upon completing the three Phase II investigations, no additional archeological testing (Phase III) was recommended because the sites were not considered eligible for inclusion on the National Register of Historic Places or they were found to have limited research potential. Additionally, no further work was recommended for any of the isolated finds or architectural sites.

The Forest Service was provided copies of the Phase I report (July 2005) and the Phase I and Phase II report (September 2008). One of the prehistoric sites is on Forest Service land. Impacts to this site as a result of project installation will be avoided. Refer to the Investigation and Analysis section (Appendix C) of this report for more information. No additional cultural resources investigations are proposed to be conducted on Forest Service lands.

There are no cultural resources listed on the National Register of Historic Places in or adjacent to the Site 16 project area. Near the eastern portion of the proposed dam Site 16 the National Forest has surveyed sections of the forest. No recorded sites are listed near the project.

The WV SHPO has concurred with all the NRCS findings (See SHPO letter January 29, 2009, Appendix F). There are no federally recognized tribes in West Virginia, and as such, no government-to-government consultation was required. Furthermore, Hardy County is not claimed as an ancestral homeland to native tribes.

### No Action Future Without Project Alternative

Without construction of Site 16, there will be no additional cultural resources investigations and no additional discoveries. None of the existing cultural resources on the site would be disturbed by Federal agency actions.

### ***Environmental Justice***

#### Existing Conditions

The Lost River Subwatershed is rural and predominately agricultural. There are no federally recognized tribes and there is a very low minority population in the watershed. Farming is the primary occupation although most families have supplemental off-farm income. The watershed population is 99% white.

#### Alternative 1

There are no disproportionally high adverse effects expected on environmental justice populations with implementation of Alternative 1 on any lands, including Forest Service lands. Public participation opportunities have been made available in the watershed, facilitating access to all interested persons. No tribes, minority groups or income classes will be impacted disproportionately via this action.

### No Action Future Without Project Alternative

There is no disproportionate adverse effect on minorities, tribes, or income classes without the construction of Site 16.

## **Cumulative Impacts**

This section evaluates the potential cumulative impacts of Alternative 1 and other identified past, present, and reasonably foreseeable projects on the environment. A description of the projects and an assessment of the potential cumulative effects on the environment are also detailed in this section.

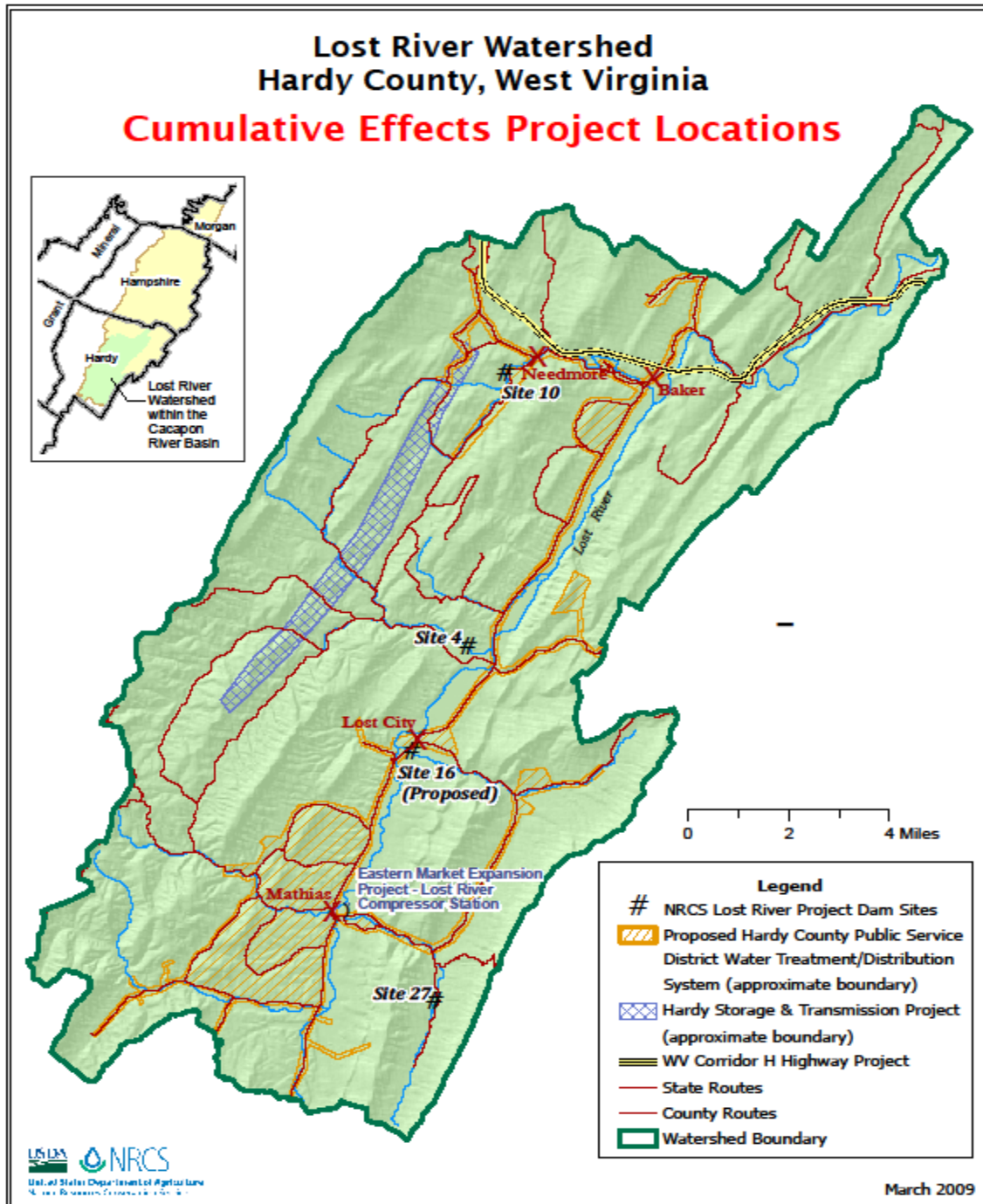
An interdisciplinary team has determined that the Cacapon Watershed, which contains the Lost River Subwatershed, is the appropriate geographic scale for evaluation. Information on these projects was obtained through a variety of methods, including agency consultation, published environmental documents, and public comments. Where quantification was not possible, an interdisciplinary team determined qualitatively through best professional judgment whether there could be a cumulative effect on an environmental resource. The known or anticipated environmental impacts resulting from these actions are described below.

### **Description of Identified Projects**

In addition the Lost River Subwatershed Project, five other projects have been identified as having potential impacts to land and aquatic resources in the Cacapon Watershed. These projects include:

- The West Virginia Corridor H Highway Project;
- Hardy County Public Service District, Baker/Mathias Raw Water Treatment Plant and Water Distribution System;
- The Hardy Storage and Transmission Projects;
- The Eastern Market Expansion Project; and
- Continued residential and commercial development.

The relative locations of these projects, compared to the Lost River Subwatershed impoundments are shown on the following figure.



The **West Virginia Corridor H Highway Project** is comprised of a new 4-lane highway planned from west of Elkins, West Virginia to the Virginia State line east of Wardensville, West Virginia. The total highway project is proposed to be approximately 108 miles in length. The project was divided into ten construction segments that are either complete, under construction or still in design or planning stages.

The **Hardy County Public Service District, Baker/Mathias Water Treatment and Distribution System** is proposed to expand water service within Hardy County. A water treatment plant is proposed for construction below the existing flood retarding/water supply impoundment at Parker Hollow (Site 10). This 350 gallon per minute plant will utilize raw water from the Site 10 impoundment. Land for this treatment facility is currently in public ownership and is available for use by the Hardy County PSD. The treatment plant site was previously disturbed during the construction of Site 10.

A water transmission and distribution system is proposed for the Baker/Mathias areas of Hardy County that will serve an estimated 988 customers once all phases are complete. This system will ultimately consist of approximately 114 miles of water line ranging in size from six to 12 inches in diameter. The proposed system will include eight water booster stations and eight water storage tanks. The total estimated cost of this transmission/distribution system is about \$20,361,000.00.

Due to the estimated cost of these water system proposals, the Hardy County PSD project has been divided into five phases. Phase I includes the treatment plant at Parker Hollow and about

27.7 miles of water transmission/distribution lines to the Baker, Needmore and Arkansas areas, and along Route 259. This phase will provide water service to an estimated 293 customers. The Hardy County PSD has applied for funding and intends to initiate construction on Phase I as soon as funding prerequisites are achieved. To date, the PSD has not yet obtained the minimum number of commitments from prospective customers interested in connecting to this water system. Phase II will connect to the Phase I line about three miles north of Lost City and extend south to the Mathias area. Phase II is estimated to include about 19.5 miles of water lines and will serve about 225 additional customers. Funding for Phase II has not yet been secured. The cost of installing Phase I, including the Water Treatment Plant, and Phase II is estimated to be \$7,945,000 and \$3,205,000, respectively. Detailed information for additional phases is unavailable at this time.

The **Hardy Storage and Transmission Projects** include upgrades and expansion of the storage and transmission facilities associated with natural gas storage and transmission by the Hardy Storage Company, LLC, and a joint venture between Columbia Gas Transmission Corporation and Piedmont Natural Gas Company. This project will develop new storage facilities in a nearly depleted, self-contained geologic formation in the Oriskany sandstone that was used for natural gas production in the 1960s and 1970s. The project will make use of the Lost River field and the Inkerman field as the two main reservoirs. Twelve existing wells will be reconditioned for use in the storage fields and eleven new wells will be constructed for storage on previously undisturbed sites in Hardy County. Three new wells are proposed to be constructed on existing production well sites in Hampshire County. Pipelines connecting the storage wells and production wells adjacent to the storage fields are proposed.

Transmission pipelines are proposed to connect the storage fields to the Hardy Compressor Station to be upgraded near Mathias (see the Eastern Market Expansion Project discussion below). This compressor station would provide for injections and withdrawals of natural gas in the storage fields, as well as provide for additional compression for gas transmission.

The **Eastern Market Expansion Project** is proposed to improve the deliverability of natural gas from storage fields and to increase natural gas transportation capacity to distribution companies in the Mid-Atlantic region. The project consists of:

- Expanding existing storage fields in Ohio and Kanawha County, West Virginia;
- Increasing compressor capacity at four existing compressor stations in West Virginia; and
- Constructing three sections of 26- to 36-inch diameter pipeline loop in Virginia and Clay and Randolph Counties, West Virginia, totaling 15.5 miles.

The only portion of the Eastern Market Expansion Project that may affect the Lost River Subwatershed is the upgrade of the Lost River compressor station near Mathias, Hardy County. None of the pipeline loop construction or storage field improvements associated with this project are in the Lost River Subwatershed.

**Continued Residential and Commercial Development** is projected to occur in the watershed based on past trends. Residential development has traditionally occurred along the ridge tops of the watershed (see residential and commercial construction map, Appendix B). Commercial development is anticipated to occur at the Baker exit along Corridor H. Specific impacts to the



environmental resources cannot be quantified due to the random nature of private land development.

### Environmental Effects

Each of the five projects is described below along with the known or potential environmental impacts resulting from these projects. Cumulative effects of all actions, including the implementation of various components of the Lost River Subwatershed project, are described in the Summary and Conclusions section for each resource of Concern.

The **Corridor H** highway will cross the Cacapon Watershed (including the Lost River subwatershed) in the vicinity of an interchange located at Baker, West Virginia. The highway segment west of Baker, toward Moorefield, has been completed. Approximately 9 miles of this segment lies within the Cacapon Watershed. The segment from Baker east to Wardensville was completed in the fall of 2006. The entire 6.7 miles of this highway segment lies within the Cacapon Watershed. The most eastern Corridor H segment is 6.5 miles long and runs from Wardensville to the Virginia state line. This segment lies entirely within the Cacapon watershed. Approximately 22.2 miles of the Corridor H highway will lie within the Cacapon Watershed.

The Corridor H highway will have converted about 1,784 acres of forestland and 673 acres of farmland, within the Cacapon Watershed, to highway uses when complete. Forest and farmland conversion was estimated to result in a net loss of about 1,602 wildlife habitat units within the Cacapon Watershed. An additional 949 wildlife habitat units were estimated to be lost from secondary impacts resulting from predicted development within the watershed. Impacts to

farmland by this highway in Hardy County included the removal from production of about 88 acres of Prime Farmland and 109 acres of Statewide Important Farmland. These amounts comprised 0.06 percent of the total farmland in Hardy County.

Nineteen wetlands comprising a total of 2.66 acres will be impacted by the corridor highway in the Cacapon watershed. These wetlands were estimated to be about 0.28 percent of the wetlands existing within the Cacapon watershed. Wetland types impacted include one forested wetland (0.24 acres), two scrub/shrub wetlands (0.14 acres), 11 emergent wetlands (1.63 acres) and five areas of open water (0.65 acres).

There is an estimated 96 miles of perennial streams in the Cacapon watershed. The Corridor H highway is expected to impact 9,650 feet of perennial streams as the result of installing pipes and box culverts. An additional 1,350 feet of perennial streams are expected to be relocated, to accommodate highway construction in the watershed.

The **Hardy County Public Service District, Baker/Mathias Water Treatment and Distribution System** is proposed for construction as soon as prerequisites for funding can be achieved. The water treatment plant will be constructed on 2 to 2.5 acres of land below the Parker Hollow impoundment that is already in public ownership. The water transmission and distribution lines are planned to be installed along existing state and county road rights-of-ways. A small amount of land will need to be acquired in order to construct two water storage tanks and two booster pump stations. The water storage tanks are estimated to require up to 0.25 acres each and the booster pump stations will require no more than 0.1 acres each.

Numerous stream crossings will be involved with the installation of the 47 miles of water transmission and distribution lines. Impacts to these streams will be minimal because stream crossings will be adjacent to roadway crossings. Erosion and sedimentation control measures will be followed and disturbed areas will be revegetated. This project appears to be located entirely within the Lost River watershed.

The **Hardy Storage and Transmission Projects** was scheduled for construction during the calendar years 2006 and 2007. The report estimated that 508.2 acres of land would be involved to install the compressor station, new pipelines, well sites and other facilities. Of this total, 152.9 acres would be used temporarily for construction and 355.3 acres would be used for permanent operation. Most of this project would involve sites, access roads and rights-of-ways already utilized for natural gas operations. The Environmental Assessment for this project (Federal Energy Regulatory Commission 2005) estimated that about 50 acres of forestland would be disturbed to install these facilities and 33 of these acres would be maintained for permanent operations. The report also estimated that about 28 acres of farmland would be disturbed during installation and 16 of these acres would be maintained for permanent operation. Restoration to prior uses was indicated for the 28 farmland acres. In addition, 4 acres of prime farmland would be utilized for the compressor station near Mathias. These acres would be removed from farmland uses. No other classified farmland impacts were identified.

The Environmental Assessment also indicated that approximately 72 wetland areas would be affected by natural gas facility installation. The effected area of these wetlands totaled 7.12

acres. Impacted wetlands were to be restored to original contours and revegetated with an approved wetland seed mixture. One hundred fifty two stream crossings were anticipated to be required to install pipelines. These include 54 perennial streams, 55 intermittent streams and 43 ephemeral channels. Best management practices in accordance with federal and state permit conditions were identified to minimize impacts to affected streams. No long term adverse impacts to fisheries were anticipated. Nearly all of this project will be within the Cacapon watershed.

The **Eastern Market Expansion Project** will only involve the Lost River watershed at the compressor station location near Mathias. Land resources involve about 6.9 acres that are within the existing Columbia Gas compressor facility.

**Continued residential and commercial development** may result in short term erosion and sedimentation, dust and noise during construction, increased impervious surfaces, locally increased runoff, changes in land use and to the vegetative community, and fragmentation of wildlife habitat. Development also produces increased demands on local public services and increased flood risk if development is within the floodplain. Demands upon the water supply also will increase, either through the installation of additional private wells, putting additional pressure on limited groundwater resources, or connections to the planned water distribution system. Due to the random and unpredictable nature of private development, there is no specific quantified information available regarding impacts to specific environmental resources. The likely foreseeable impacts are described qualitatively rather than quantitatively.

## **Summary and Conclusions for Cumulative Impacts**

The Cacapon River Watershed, inclusive of the Lost River Subwatershed, has a long history of activities that have altered the physical and biological composition in the region. Extensive timber harvesting in the late 1800s and early 1900s resulted in the removal of nearly all of the mature forests in the watershed. Streams were impacted by increased surface runoff following the removal of timber resulting in increased flood frequencies and magnitudes. Streambanks and channels exhibited increased levels of instability resulting in increased sediment transport, increased sediment and debris deposition and lateral stream channel migration. Landowners routinely modified stream channels to reduce flooding impacts, remove debris and to facilitate land utilization. Farming activities throughout the watershed were more intensive as family farms produced food and fiber for subsistence and marketing. Open agricultural lands were more prominent in the first half of the Twentieth Century than the current conditions that are dominated by forestland. The following tabulation is a summary of the areas of concern. More detailed discussion follows the tabulation.

**Tabulation 4. Summary of Cumulative Impacts of the Lost River Subwatershed Project and Other Past, Present and Future Projects in the Cacapon River Watershed, West Virginia.**

<b>AFFECT</b>	<b>Lost River Site 16</b>	<b>Lost River Sites 4, 10 and 27</b>	<b>Corridor H Highway</b>	<b>Hardy PSD water treatment and Distribution</b>	<b>Hardy NG Storage and Transmission Project</b>	<b>Eastern Market NG Expansion Project</b>	<b>Total Resource Impacted <u>Total acres in Cacapon Watershed</u> (% of Total)</b>
Project Land Requirements (acres)	234.4 ac	416 ac	2,457 ac	3.2 ac	508.2 ac	6.9 ac	3,626 acres <u>442,880 acres</u> (0.8%)
Forest land converted (acres)	28.6 ac	88 ac	1,784 ac	0.5 ac	50 ac	0	1,951 acres <u>363,162 acres</u> (0.5 %)
Farmland Converted (acres)	197.7 ac	146.5ac	673 ac	0	28 ac	0	1,045 acres <u>75,290 acres</u> (1.4 %)
Prime Farmland (acres)	27.9 ac	35 ac	88 ac	0	4 ac	0	155 acres <u>16,437 acres</u> (0.9 %)
Impacted Wetlands (number) <sup>1/</sup>	8	5	19	None specified	72	0	104
Impacted Wetlands (acres)	16.02	0.39 ac	2.66 ac	None specified	7.12 ac	0	26.2 acres <u>863 acres</u> (3.0%)
Habitat Units	97		2,551				2,648 HU <u>124,155 HU</u> (2.1%)
<b>Perennial Streams</b>							
Number Impacted (crossed)	1	3	21 (8 box culverts & 13 pipes)	Not specified	54	0	79
Length converted (feet)	2,785ft	10,220 ft	9,650 ft	0	0	0	22,655 feet <u>506,880 feet</u> (4.5 %)
Length disturbed (feet)	140 ft	900 ft	1,350 ft	Not Specified	2,700 ft	0	5090 feet <u>506,880 feet</u> (1.0 %)

<sup>1/</sup> For all the above listed projects, wetland impacts are required to be mitigated resulting in no net loss of wetland acres.

## **Forestland**

The Appalachian Corridor H FEIS (WVDOT and FHWA 1996) stated that there are 692 square miles (442,880 acres) in the Cacapon River Watershed. The projects described above, along with the three existing Lost River impoundments and the proposed Site 16 project, collectively require approximately 3,623 acres of land (Tabulation 4) in the watershed. This amount comprises about 0.8 percent of the land area in the watershed. The Corridor H FEIS also stated that 82 percent of the watershed was comprised of forestland (363,162 acres). Forestland required for the projects in Tabulation 3 was about 1,951 acres or approximately 0.5 percent of the forestland in the Cacapon Watershed. It is anticipated that some additional acreage will be converted from forest to residential or commercial use. Presently, it is difficult to quantify the extent of conversion to these uses, as they are privately controlled. In the context of total forestland in the watershed, the predicted impact from the proposed action combined with the other past, present, or reasonably foreseeable actions is not considered a significant cumulative impact on forestland.

## **Farmland**

Farmland was estimated in the Corridor H FEIS to be 75,290 acres or 17 percent of the Cacapon Watershed. Soils classified as farmland in the Cacapon Watershed total 98,391 acres (USDA-NRCS SSURGO data). The difference is likely because not all of the prime and important farmland classified soils are utilized for farm land uses. Similarly, some farm land uses include soils that are not classified as prime or important farmland.

NRCS SSURGO data indicates there are 16,437 acres of prime farmland in the Cacapon Watershed. Tabulation 4 shows that the cumulative area of prime farmland converted for these

projects totals 155 acres. This number represents 0.9 percent of the prime farmland in the watershed. It is anticipated that some additional acreage will be converted from agricultural lands to residential or commercial use. Presently, it is difficult to quantify the extent of conversion to these uses, as they are privately controlled. In the context of total farmland in the Cacapon Watershed, the predicted impact from the proposed action combined with the other past, present, or reasonably foreseeable actions is not considered a significant cumulative impact on prime farmland, statewide important farmland, or locally important farmlands.

### **Habitat**

Land use conversion will also impact wildlife habitat through direct changes to the vegetation community and vegetative structure, habitat fragmentation, loss of riparian areas along streams, and creation of open-water areas. The proposed action is estimated to result in a loss of 97 habitat units (HU) for terrestrial wildlife, or a 24 percent reduction of the existing habitat units on the 234.4 acre project site (see Mitigation Summary in Recommended Plan section of this document). The Corridor H project was estimated to result in a net loss of about 1,602 wildlife HU, and an additional 949 wildlife HU were estimated to be lost from secondary impacts resulting from predicted residential or commercial development within the watershed. It is recognized that many of the larger residential parcels would not be completely converted from their present land use type and would still provide some benefit to a variety of wildlife species. The total terrestrial habitat lost from these two projects and resulting development is estimated to be 2648 HU. However, the open-water in the new impoundment will result in the creation of an additional 30 HU for fish species.



Habitat impacts from the three existing Lost River impoundments have been minimal. Habitat losses resulting from the construction of the three embankments and auxiliary spillways were offset by mitigated habitat enhancements around the reservoirs and the creation of open water habitats.

Most areas within the Cacapon Watershed provide habitat for migratory birds. Land use changes will result in a loss of habitat for some types of migratory birds, such as common songbirds.

However, birds that utilize and feed upon open water, such as migratory waterfowl, bald eagles, and osprey, as well as those that depend upon shallow water habitats, such as shore and wading birds, will be benefited through the provision of additional habitat that is currently limited within the watershed. These benefits were not fully captured in the habitat evaluation procedures used (see Mitigation Summary in Recommended Alternative section of this document).

The Corridor H FEIS estimated that forestland and farmland in the Cacapon Watershed contained a total of 124,155 HU. Cumulative habitat losses of about 2,648 HU comprises no more than 2.1% of the habitat in the Cacapon Watershed. These habitat changes are not considered to be a significant adverse cumulative impact considering the large percentages of forest and agricultural lands that remain as terrestrial wildlife habitat within the watershed.

## **Wetlands**

The Corridor H FEIS estimated that there are 862.7 acres of wetlands in the Cacapon River Watershed. Tabulation 4 estimates that 26.2 acres may be impacted collectively by the listed projects. This amount comprises approximately 3.0 percent of the known wetlands in the watershed. This number does not take into account that mitigation is required to offset impacts to wetlands that can not be avoided. This mitigation most often requires a number of acres of

wetlands to either be constructed or enhanced that equal or exceed the wetland acres adversely impacted. Wetland mitigation requirements result in no net loss of wetlands in the Cacapon Watershed as a result of these projects. Wetland impacts resulting from residential or commercial development in the past or foreseeable future have not been documented. Disturbances to wetlands resulting from the activities described in this section are not considered to be a significant adverse cumulative impact to the total amount of wetland habitat within the watershed.

### **Perennial Streams**

The total length of perennial streams in the Cacapon River Watershed is estimated to be 96 miles (506,880 linear feet) in the Corridor H FEIS report. Tabulation 4 estimates that about 22,655 linear feet of these streams were eliminated or enclosed within culverts or pipes. This amount, assuming that all of the impacted streams were perennial streams, amounts to 4.5 percent of the perennial streams within the watershed. An additional 5,090 linear feet (1.0 percent) of perennial streams in the watershed were disturbed, but not eliminated by these projects. Disturbed streams included those altered or relocated by the construction projects and those where natural stream restoration measures were applied for mitigation. In the context of the total length of perennial streams in the Cacapon Watershed, the potential impact from the proposed action is not considered a significant cumulative impact on perennial streams.

This report has considered the cumulative impacts upon land and aquatic resources that have resulted, or is expected to result, from the implementation of major construction projects within the Cacapon River Watershed. The improvement of natural gas facilities and the construction of

the Corridor H highway have benefits far and beyond the Cacapon and Lost River Watersheds. The two natural gas projects are intended to improve the availability of natural gas throughout the entire eastern United States. Natural gas supplies may be improved locally as a benefit of these projects. The Corridor H Highway will ultimately connect Interstate 81 in Virginia with Interstate 79 in West Virginia. This east-west highway will improve transportation from the more densely populated areas of Virginia to points west including much of West Virginia. By improving transportation, the mountainous Eastern Panhandle area, including the Cacapon River Watershed (and Lost River Subwatershed) is expected to become more accessible and desirable for residential development. Commercial development as a result of the new highway is also anticipated.

Growth trends in Hardy County support the need for the Lost River Subwatershed project, including the proposed Site 16 impoundment on Lower Cove Run. New highway construction and population expansion from the east coast metropolis to the more rural Hardy County is already occurring, underscoring the need to plan and implement measures for watershed protection, flood protection and sustainable water supplies to meet future needs.

### **ADVERSE EFFECTS WHICH CANNOT BE AVOIDED**

There are no significant adverse environmental effects associated with the implementation of Alternative 1 that cannot be mitigated. Adverse social effects related to property acquisition for the effected landowners is acknowledged. Financial compensation will be provided to residents whose property is affected by project actions. Additional discussion on the impacts to property owners within the acquisition area for Site 16 can be found in the Recommended Alternative section of this document.

## **THE RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY**

In the short-term, there will be construction impacts associated with Alternative 1. Adverse impacts such as erosion and sedimentation will be minimized by the use of best management practices during construction. Minimal land disturbance and temporary mitigation measures will be implemented to reduce or replace short term losses. In the immediate area of the planned structures, long term land use will be changed from agricultural production to a lake environment. Long term productivity of downstream properties will be further enhanced by reduced flooding and increased and improved water supply.

## **IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

Land obligated by Alternative 1 will be converted from private to public land. Presently, this land is in agricultural, forestry, and residential use. Approximately 0.4 acres of US Forest Service land will be permanently converted to impounded water by Alternative 1. An additional 11.5 acres of US Forest Service land will be periodically inundated. Labor and energy required for construction and maintenance of structural measures associated with Alternative 1 will be irretrievably committed. Federal funds for Alternative 1 will be expended.

## **POSSIBLE CONFLICTS WITH LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA**

There are no known conflicts with any policies or plans in the watershed with respect to Alternative 1.

## **RISK AND UNCERTAINTY**

Estimating project costs and benefits involves a certain degree of risk and uncertainty.

Assumptions made during the planning process are based on the best available technology and information at the time of planning. Extended delays between planning and implementation increase the degree of risk and uncertainty. Estimated project costs are based on computed work quantities multiplied by the appropriate unit cost for that type of work. Unit costs are based on historical data from similar projects, indexed to current price levels. Costs can be influenced by several economic factors that cannot be predicted with certainty during the planning process. Fuel shortages, unforeseen labor and materials shortages, natural disasters, and international incidents can adversely affect costs.

Economic benefits are based on material values of floodplain property and infrastructure. Such property is expected to become more valuable in the future as personal income increases. It is probable that some monetary and non-monetary benefits have not been fully captured. Finally, there is inherent uncertainty in estimating the social and environmental costs associated with Alternative 1 because values and judgment vary among interested parties.

Water supply projections are based on population and housing trend data and typical development patterns associated with new highway construction. Demands for water may exceed estimates if a major industrial or commercial water user locates in the watershed. Conversely, demands for water may decrease if development trends reverse. Additionally, a prolonged drought or unforeseen decline in the dependability of groundwater could drastically change the demand for a public water supply.

There are uncertainties with regard to any scientific modeling techniques applied to watershed analysis. Uncertainties are reduced by using standard procedures, trained specialists, and rigorous quality control procedures.

### **RATIONALE FOR RECOMMENDED ALTERNATIVE**

Two alternatives are compared in detail in the context of this report: The No Action Future Without Project (NAFWP) Alternative and Alternative 1. Under the NAFWP Alternative, there would be no additional flood protection and no additional water supply provided. Needs for these resource concerns would not be met. The NAFWP Alternative is the National Economic Development (NED) Plan because it is the alternative with the greatest net benefits. However, the NED Plan does not meet the needs so it is not the recommended alternative. Alternative 1 provides the identified additional flood protection and water supply needs. Alternative 1 also provides non-monetary benefits in terms of improved human health and safety and reduced future stress on existing water supplies. These non-monetary benefits are not reflected in the NED calculations. Alternative 1 is the Recommended Alternative because it best meets the needs and is a viable alternative.

### **CONSULTATION AND PUBLIC PARTICIPATION**

There have been opportunities for public participation at monthly conservation district meetings, WV State Conservation Committee quarterly meetings, and also at Hardy County Commission meetings. Consultations with other interested agencies and entities have also been conducted. An agency coordination meeting was conducted at the proposed site in October 2005.

Additionally, a widely-advertised public scoping meeting was held in the watershed in August 2006. State and federal agencies such as the US Forest Service, US Fish and Wildlife Service, WV Division of Natural Resources, and the State Historic Preservation Office have been consulted during the planning process.

A public scoping workshop was held on August 1, 2006 at East Hardy Middle School to provide interested individuals and agencies an opportunity to give input into the development of the EIS. There were 25 people in attendance at the workshop, including 11 from the implementing and cooperating agencies and local sponsoring organizations. One other governmental agency representative and 13 individuals with an interest in the project attended.

Comments were taken at the workshop and also after the workshop for a period of 15 days. Seventeen responses were received, including written comments and emails. Comments received regarding alternatives and environmental concerns are summarized in the following tabulation (Tabulation 5).

**TABULATION 5**  
**SCOPING COMMENTS RELATIVE TO**  
**ALTERNATIVES AND ENVIRONMENTAL CONCERNS**  
**LOST RIVER SUBWATERSHED**

<b>Issues</b>	<b>Number Comments</b>
Consideration of a “no build” alternative	3
Consideration of water supply	8
Demographic assessments	3
Effectiveness of existing dams	7
Land treatment	2
Wetlands	7
Benefit cost analysis	8
Agency consultation	3
Archeology investigations	3
Borrow material sources	1
Recreation alternative	3
Consideration of dredging, channelization, buyouts, etc.	3
Social impact analysis	2
Consideration of moving Site 16 upstream	1
Sediment loads from Lower Cove Run	1
Updated costs for project	1
Wildlife habitat evaluation	3
Stream data	1

When applicable, issues raised at the public scoping meeting were incorporated into the Draft Supplemental Watershed Plan – First Draft EIS.

The First Draft EIS was distributed by mail on or about August 25, 2006 to agencies, stakeholder groups and individuals (see distribution list, Appendix G) for the purpose of soliciting comments. A postcard notification, announcing the availability of the First Draft EIS, was also sent to agencies, stakeholder groups, tribal representatives and individuals located beyond the immediate project area that may have an interest in the proposed project. Hard copies of the



report were available to those requesting copies and the First Draft EIS was posted electronically on the West Virginia NRCS website.

An informational workshop was held at the Baker Fire Hall on September 26, 2006 to provide interested individuals and agencies an opportunity to obtain information regarding the First Draft EIS for the proposed Site 16 project. Approximately 26 persons attended the workshop including 11 from the implementing and cooperating agencies and local sponsoring organizations. The remaining attendees were individuals with an interest in the project.

NRCS personnel from multiple disciplines were available at the workshop to entertain questions and discuss matters related to the First Draft EIS. Written comments were taken at the workshop and by mail or email. Comments were requested to be received at the NRCS State Office in Morgantown by October 25, 2006.

All of the comment letters, emails and other written comments received from agencies, stakeholder groups and individuals as a result of the review of the First Draft EIS are contained in Appendix G. This Appendix also contains the point by point disposition of the comments for which responses were prepared.

A Final Environmental Impact Statement for the Lost River Watershed Project was issued in May 2007. A Record of Decision (ROD) was issued in July 2007. In February 2009, NRCS made a decision to withdraw the ROD for this project. Notices were mailed to agencies, non-governmental organizations and individuals effected by or interested in the Lost River Watershed

Project. The intent of NRCS is to update information contained in the 2007 FEIS and re-issue this document as a second Draft Supplemental Environmental Impact Statement (second DSEIS). The second DSEIS will be distributed for review and comment by agencies, non-governmental organizations and interested individuals. The distribution list for the Second Draft EIS follows:

**Distribution List for  
Second Draft EIS  
Lost River – Site 16:**

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Division of Culture and History  
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Director  
Office of Environmental Project Review  
US Department of Interior  
Room 2024  
Washington, DC 20240

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## **RESPONSES TO LOST RIVER COMMENTS – SECOND DRAFT**

This section is reserved for comments on the Second Draft EIS. Comment letters and responses received following the release of the First Draft EIS are contained in Appendix G.

### **RECOMMENDED ALTERNATIVE**

Refer to the 1974 Work Plan – FEIS and Supplements 1, 2, and 3 for information on the setting and construction specifics for Site 4, Site 27, Site 10 and the land treatment component. The following information is specific for Site 16.

#### **Setting**

Site 16 is located in Hardy County on Lower Cove Run. Lower Cove Run is a tributary of Lost River and is regionally within the Potomac River Basin. The site is located approximately 0.5 mile southeast of the community of Lost City (Appendix B).

The site's physiography is valley and ridge with hilly topography. Ground surface elevations in the stream valley range from 1495 to 1520 feet Average Mean Sea Level (AMSL) at the dam site. Elevations of the surrounding hilltops range from 1640 to 2120 feet AMSL. The valley bottom at the dam site is approximately 1,334 feet wide. Hill slopes are moderately steep.

## **Planned Action**

The planned action consists of completing Alternative 1 by constructing Site 16. Site 16 will consist of a compacted earth and rock fill embankment, encompassing a volume of 1,338,000 cubic yards. Fill will be obtained from the excavation of the auxiliary spillway, as well as other sources on site. Borrow areas providing a source of clay soils, necessary to limit water seepage through the dam, will be obtained from the permanent and flood pool areas, along both abutments, and in the auxiliary spillway (see borrow map, Appendix B). A cutoff trench will extend into the foundation, and a drainage system will collect seepage.

The principal spillway is planned as a drop inlet structure consisting of a reinforced concrete riser, a reinforced concrete pipe, and a reinforced concrete impact basin to dissipate energy at the outlet end of the pipe. The auxiliary spillway will be 400 feet wide and shall be located in the left abutment. Approximately 43.6 acres of flowage easements will be needed in the event of flow through the auxiliary spillway. The surface area of the permanent pool will be 46.6 acres, the surface area of the flood pool at the crest elevation of the auxiliary spillway will be 86.8 acres, and the surface area of the pool at the top of dam elevation will be 97.4 acres. The volume of sediment storage allocation is 229 acre-feet.

Construction will be performed using best management practices, so as to minimize erosion and prevent pollution. Soil disturbance will be kept to a minimum. Disturbed areas will be seeded, limed, fertilized, and mulched immediately after work has been completed.

Temporary bridges or other structures will be used when frequent crossing of streams is required. Diversion channels and sediment basins will be constructed, as necessary, to control sediment discharge from the project area.

Clearing will take place in areas of the permanent pool, dam foundation, auxiliary spillway, and borrow areas. All trees in the permanent pool area will be removed to minimize long-term operation and maintenance costs to sponsors and to minimize adverse impacts to the riser.

The 46.6 acre permanent pool is designed to include 400 acre-feet of water supply storage, which will be accessed via a water supply pipe, mounted to the riser and extended downstream of the structure.

The permanent pool will be available for incidental public recreation, including fishing and electric or non-motorized boating. About 234.4 acres, including the permanent pool and adjacent land, will be placed in public ownership (11.9 acres is already in public ownership with the US Forest Service). The land will be owned by the West Virginia State Conservation Committee according to State Code. The site will be maintained by the Sponsors with the Potomac Valley Conservation District (PVCD) in the lead role. The fishery resources will be managed by the WVDNR including angler access, stocking, and law enforcement. Three occupied houses and associated outbuildings and utilities in the flood pool will need to be relocated to accommodate the project.

## **MITIGATION SUMMARY**

Implementation of the Lost River Subwatershed Dam Site 16 on Lower Cove Run will result in the unavoidable impacts to aquatic and terrestrial resources within the 234.4 acre project location. Most of these impacts will result from the construction of the embankment (dam), auxiliary spillway and the creation of the 46.6 acre permanent reservoir pool. Mitigation measures have been developed in consultation with biologists with the WVDNR. Areas of resource impact and proposed mitigation measures are as follows:

### **WETLAND IMPACTS**

As indicated in the environmental consequences section and the Wetlands Delineation Report (Appendix D), 16.02 acres of delineated wetlands (Center of Area 1, Area 5 and Area 6) will be disturbed by project construction or converted to other uses. These impacted wetlands have low functional value and are used for agriculture including crop production (corn), hay production and pasture. These wetlands have surface drainage and the vegetative composition has been altered as a result of tillage and livestock grazing. An additional 9.63 acres of wetlands will be avoided. The avoided wetlands are partially emergent (west and east ends of Area 1) with forested and scrub-shrub components (Areas 2, 3, 4, 7 and 8) that have a somewhat higher functional value.

## **LOWER COVE RUN (STREAM) IMPACTS**

A total of 6,100 linear feet of Lower Cove Run lies within the 234.4 acre project area. The placement of fill to construct the dam will cause 570 linear feet of Lower Cove Run to be eliminated. The 46.6 acre impoundment will permanently inundate 2290 linear feet of Lower Cove Run. An additional 180 feet of Lower Cove Run will be abandoned and replaced by an equal length of rock lined outlet channel below the impact basin. A length of 825 feet of Lower Cove Run lies between the outlet channel and the lower-most project boundary. This 825 linear feet of stream will not be directly impacted by project construction, but will no longer be subjected to flood flows above the design discharge of the riser structure. Discharges to this stream reach will no longer contain small gravel or larger sediment. Upstream, about 450 linear feet of channel will be subjected to periodic, temporary inundation due to floodwater detention. Approximately 975 feet of Lower Cove Run will be infrequently inundated as a result of floodwater detention. The upper-most 810 feet of the stream will be above the flood water detention pool and will not be adversely impacted by the Site 16 project.

Other small tributaries, ditches or drainage swales within the Lower Cove Run project area were included within the delineated wetland areas or were determined to be non-jurisdictional.

A fishery survey was conducted on Lower Cove Run within the Site 16 project area on April 25, 2005 (Appendix D). This survey revealed seven species of fish comprised of 985 individuals. The total weight for this sample was 3.004 Kg. Three young-of-the-year brook trout, averaging

one gram each, were obtained during this survey. No other trout or game fish species were observed during this evaluation.

The entire 6,100 linear feet of Lower Cove Run within the project area was evaluated in October 2007 using the EPA's Rapid Bioassessment Protocols (Barbour, et al. 1999). The stream was divided into reaches based upon channel dimension, pattern and profile, substrate composition and other physical characteristics. The following tabulation displays the RBP Habitat scores, habitat deficiencies, project effects and prospective mitigation.

Tabulation 6. Lower Cove Run stream reaches, RBP scores and project affects.

	<b>Reach 1</b>	<b>Reach 2</b>	<b>Reach 3</b>	<b>Reach 4</b>
<b>REACH LENGTH (FT)</b>	1785	1375	1140	1800
<b>RBP HABITAT SCORES</b>	181	171	139	133
<b>HABITAT DEFICIENCIES</b>	Width and composition of riparian zone vegetation on right bank is suboptimal.	Stream substrate is 25-50% imbedded. Erosion along 5-30% of right bank. Riparian zone vegetation along right bank is suboptimal.	Deep pools rare or absent. Channel nearly straight, low sinuosity. Right bank moderately unstable, 30-60% eroded. Riparian vegetation on right bank marginal.	Velocity and depth regime marginal, mostly shallow. Sediment deposition evident 30-50% of stream bottom. Riffles dominant geomorphic feature. 5-30% of banks with erosion. Right bank riparian vegetation impaired by grazing.
<b>PROJECT EFFECTS</b>	Upper 810' feet (ASW to TOD) no impact. Lower 975' subject to infrequent inundation in flood storage pool.	Upper 450' subject to periodic inundation by flood pool. Lower 925' of stream eliminated, permanently inundated by permanent pool.	Entire 1140' reach eliminated, permanently inundated by permanent pool.	225' eliminated, permanently inundated by permanent pool. 570' feet eliminated by dam and PSW. 180' of channel replaced with a PSW outlet channel. Lower 825' not altered by construction, subject to elimination of large sediment.
<b>MITIGATION MEASURES</b>	Improve riparian vegetation along right bank.	Improve riparian vegetation along right bank. Lower 925' of stream habitat eliminated.	Stream habitat eliminated on entire 1140' reach.	Upper 795' of stream habitat eliminated by PP and dam. 180' of channel replaced with a constructed outlet channel. Lower 825' receive grade control to prevent down-cutting. Improve riffle-pool ratio to diversify velocity and depth regime. Add boulder clusters and woody debris to provide cover.



## **TERRESTRIAL HABITAT IMPACTS**

The project area is comprised of 41.2 acres of hayland/cropland, 107.4 acres of pastureland, 81.0 acres of woodland and 1.8 acres of farmstead (homes and lawns). See Land Use Map – Appendix B. The embankment footprint will impact about 16.97 acres comprised of 7.7 acres of hayland/cropland, 3.4 acres of pasture and 5.7 acres of woodland. When complete, the embankment will be revegetated with herbaceous species and mowed periodically to minimize the establishment of woody species.

The auxiliary spillway will involve an area about 23.4 acres in size south of the embankment. The spillway area is comprised of 19.8 acres of pasture and 3.6 acres of woodland. The auxiliary spillway will be revegetated with herbaceous species and will be mowed periodically to control woody vegetation. Earth and rock material excavated from the auxiliary spillway will be utilized for constructing the embankment.

The 46.6 acre impoundment created by the embankment will permanently inundate 13.9 acres of hayland/cropland, 11.0 acres of pasture and 19.27 acres of woodland. The remaining acreage (about 145 acres) will be subject to temporary inundation as the result of flood water detention, temporarily disturbed and reclaimed in conjunction with construction activities or avoided to minimize impacts to habitat. In any event, this 145 acre area will largely serve as a buffer area around the lake and embankment, provide for public access around the impoundment and provide space for the habitat retention and the installation of mitigation measures. A small area below the dam, of about two acres more or less, will be set aside and made available for the potential future site of a prospective Hardy County PSD water treatment facility.

## **WETLAND MITIGATION MEASURES (PROPOSED)**

Mitigation for wetland impacts are proposed to be implemented on the Dam Site 16 project area to the extent possible (See Wetland Map, Appendix B). Wetland area 7 (except for 0.01 acre to be inundated), area 8 and the northeast portion of area 1 that is forested, will be avoided. About 2.75 acres of area 1 (eastern end) above the permanent pool elevation is proposed to be enhanced by interrupting drainage patterns, varying the topography and increasing the woody composition of the vegetation either through natural succession or with supplemental plantings. An additional portion of wetland area 1, about 4.5 acres, lies below the dam. This area will be avoided, if possible and enhanced from an emergent wetland type to a scrub-shrub wetland type. If this area cannot be avoided, it will be reclaimed as wetland to compensate for temporary impacts or the area used for constructed wetlands.

Wetland areas 2, 3 and 4 (comprising about 0.26 acres) will be avoided. These areas are old stream channels or flood channels that have been abandoned. These areas will be enhanced by creating additional channel-like depressions and encouraging the establishment of woody vegetation.

It has been estimated that about 5 acres of the upper shallow pool will have a depth of 3 feet or less. It is proposed that at least a portion of this shallow area be isolated from the main body of the reservoir by creating berms or other features that would enhance vegetative diversity. Additional areas just upstream of the pool area and within a few feet of the permanent pool elevation may be enhanced by creating depressions and diversifying topography. This area has

potential for acquiring wetland characteristics as a result of the elevated water table that will result from the creation of the reservoir.

Topsoil from wetland areas that will be subjected to construction impacts and that also has a predominance of native hydrophytic vegetation will be stockpiled and dispersed in the lake's shallow pool areas and in any mitigation wetlands devoid of hydrophytic species. Topsoil with atypical wetland vegetation will not be utilized in newly established or enhanced wetlands to avoid spreading non-native or potentially invasive species.

Additional opportunities to create wetlands exist on the area east (upstream) of the reservoir and lower flood storage pool. Sufficient space exists for the creation of constructed wetlands and vernal pools in this area. If additional wetland mitigation is required, project proponents will work with the US Forest Service and the state and federal resource agencies to identify suitable areas on nearby Forest Service lands where vernal pools may be constructed. In the event that all necessary wetland mitigation can not be incorporated within the Site 16 project area or on nearby Forest Service Lands, an opportunity exists to implement remaining wetland mitigation measures at the Edwards Run Wildlife Management Area in Hampshire County. This area is located just north of Capon Bridge, WV, and is presently in public ownership.

#### **LOWER COVE RUN STREAM MITIGATION (PROPOSED)**

A total of 3,040 linear feet of Lower Cove Run will be eliminated by the installation of Lost River Dam Site 16 (Table 1). Approximately 810 linear feet of Lower Cove Run lies within the upper reach of the Run above the flood storage pool that will not be affected by the project.

Another 975 linear feet of Reach 1 will be subjected to infrequent inundation during flood water detention. The RBP process identified that vegetation in the Reach 1 riparian zone along the right bank (looking downstream) was suboptimal. Portions of the riparian area along the right bank are adjacent to a residence where open areas are maintained. This area along the right bank is proposed to be allowed to grow up to enhance the amount and quality of woody vegetation in this riparian area.

About 450 linear feet of Reach 2 will be subjected to periodic inundation during flood water detention and the lower 925 feet of the stream will be permanently inundated by the permanent pool. The RBP process identified habitat deficiencies for this reach as: suboptimal vegetation along the right bank riparian zone; streambank erosion along up to 30 percent of the right bank; and stream channel substrate being 25-50 percent embedded. It is proposed that riparian vegetation along the right bank be improved and that natural stream restoration measures be installed to address the eroding stream banks along the upper most 450 feet of Reach 2.

Reach 3 will be inundated by the permanent pool of the reservoir for the entire 1140 feet length of this portion of Lower Cove Run.

Reach 4 is the most degraded section of Lower Cove Run in the project area according to the RBP scores. This reach is characterized by a shallow, over-wide channel, up to 50 percent of the substrate is comprised of depositional sediment, up to 30 percent of the streambanks exhibit evidence of erosion and the riparian zone along the right bank is impaired by grazing. The upper 795 feet of the stream will be eliminated by the dam and permanent pool. Another 180 feet will

be abandoned and replaced by an equal length of rock-lined outlet channel. The remaining 825 feet of stream between the outlet channel and the property limits will be available for installing enhancement measures. Grade control in the form a cross vanes will be installed to prevent channel down-cutting and to improve stream velocity and depth regime. Measures to address eroding streambanks will be installed. Woody riparian vegetation will be encouraged for streambank stability and shade.

Mitigation for the 3,040 linear feet of Lower Cove Run to be eliminated or permanently inundated by the project will be accomplished in part by measures proposed in the preceding paragraphs. Additional mitigation measures may be employed upstream of the Site 16 project. Sites within National Forest Lands will be particularly desirable for this purpose because they are already in public ownership. The total amount of mitigation to offset stream impacts on Lower Cove Run remains to be defined.

### **COLD WATER RELEASE AND MINIMUM FLOW**

A provision for a low-flow/cold-water release in the outlet structure of the dam will be incorporated into the outlet works. This release will consist of a gate on the intake riser about 13.2 feet below the permanent pool elevation. This gate will allow for the release of cold reservoir water to minimize any increase in downstream water temperatures during summer and early fall that might result from the release of warmer surface water from the impoundment during these warm months. In addition, this release will allow for supplementing low flows downstream of the impoundment if seasonal conditions require such an action.

## **TERRESTRIAL HABITAT ENHANCEMENTS**

Habitat within the 234.4 acre project site was evaluated using the Pennsylvania Modified Habitat Evaluation Procedure (PAM-HEP). Habitats within the project area were divided into compartments based upon vegetative similarities. Habitat suitability Index Models for species, including the fox squirrel, black-capped chickadee, eastern meadowlark, red fox, mink and channel catfish, were used to calculate Habitat Suitability Index scores for each habitat compartment. These scores were multiplied by the number of acres in each compartment and totaled to estimate habitat units within the project area. This process was applied to the project area existing conditions, project area with project installed and the installed project with mitigation applied.

Habitat for the existing conditions was calculated as 412.32 habitat units (HU). When the project conditions with the project installed was calculated, a value of 315.14 HUs was found. This difference of 97.18 HUs amounted to about a 24 percent decrease in HUs. Habitat value for channel catfish in the 46 acre reservoir was calculated to be 30.36 HUs. This brings the difference in habitat value to about 16 percent (66.82 HUs) of that of the existing conditions.

Woodland areas that will not be disturbed during construction will be left in their current state. Areas currently used for agriculture (crops, hay and pasture) that will not be disturbed during construction will be allowed to succeed through natural succession. This will include wetland areas that will be avoided and those that are subject to enhancement, including constructed wetlands for mitigation. A portion of the tree tops and brush cleared from construction areas will be windrowed along terrestrial field borders and as brush piles. Supplemental plantings, such as

pin oak, buttonbush and silky dogwood are also proposed for the upper reservoir area where they will provide a source of wildlife food.

Some of these areas provide habitat for migratory birds. Land use changes will result in a loss of habitat for some types of migratory birds, such as common songbirds. However, birds that utilize and feed upon open water, such as migratory waterfowl, bald eagles, and osprey, as well as those that depend upon shallow water habitats, such as shore and wading birds, will be benefited through the provision of additional habitat that is currently limited within the watershed. These benefits were not fully captured in the habitat evaluation procedures used.

### **RESERVOIR ENHANCEMENTS**

Consultations with the WVDNR District Fishery Biologist during project planning indicated that agency's desire to develop an "exceptional channel catfish fishery" in the Site 16 impoundment. Little emphasis is currently placed on developing a trout stocking program in the Site 16 reservoir at this time; however, trout fishing could become more of an agency priority in the future.

A specific plan for developing habitat within the reservoir for channel catfish has not been completed. A conceptual plan has been discussed for providing breeding cover, escape cover and other habitat enhancements beneficial to creating this fishery. Habitat enhancements proposed include: anchoring logs and tree-tops to create brush and woody debris piles; grading flat road-bed-like features for spawning areas for bass and pan fish; leaving the lake bottom in a rough irregular condition (no final grading to smooth features); constructing hills and hummocks

on the reservoir bottom to diversify depth; and creating boulder clusters. Trees within the reservoir area will not be left for habitat because of Sponsor's concerns with floating debris collecting around the riser. It is proposed that vertical tree stems be left after tree tops are cut to provide vertical cover along the south shoreline. More specific plans for these habitat enhancements will be developed in consultation with WVDNR prior to construction in order that equipment on site may be utilized for creating these features.

Because recreation is an important incidental use of this project, public access to the impoundment area will be provided. A parking area for recreational users will be provided on project property and a boat launching area will be constructed adjacent to the lake. Recreational users will have access to the area around the reservoir and walking paths will be graded along the north shoreline area. Walking access on the south shoreline will not be developed due to rough topography in that area.

### **MONITORING PLAN**

A monitoring plan for mitigation measures will be developed and implemented in accordance with permit requirements. This monitoring plan will define the frequency for mitigation site reviews to insure the installed measures are functioning in accordance with their design and prescribe the process for reporting the findings of field reviews to the appropriate regulatory agencies.



## **Control of Erosion and Sedimentation**

An erosion and sediment control plan will be developed by NRCS and approved by the WVDEP. This plan is required in conjunction with the construction storm water NPDES permit and will include Best Management Practices (BMPs) and other measures to minimize soil erosion from disturbed areas and prevent sediment from being deposited in undesirable locations. Erosion and sediment control measures may include minimizing the size of disturbed areas, diverting surface water from disturbed areas, temporary seeding and mulching of soil stockpiles, seeding and mulching areas upon completion of final grading, installing approved stream crossings, installing silt fences, installing sediment retention basins and other necessary BMP measures.

## **Permits and Compliance**

Section 404 of the Federal Water Pollution Control Act of 1972, as amended, requires that the deposition of dredged or fill material into wetlands and Waters of the US be authorized by the Department of the Army. Therefore, a U.S. Army Corps of Engineers permit will be required prior to installation of the project. A Section 401 State Certification as required by the Clean Water Act must be issued by the WVDEP prior to construction. Also, a construction storm water NPDES permit will be required from the WVDEP, Division of Water and Waste Management. A Special Use permit will be obtained from the US Forest Service. The PVCD will be responsible for obtaining the necessary permits, including permits from the West Virginia Public Lands Corporation.

The PVCD, with assistance from NRCS, will develop temporary and permanent measures to control erosion and sediment that will be implemented by the construction contractor in

compliance with state water quality regulations. The measures will include best management practices as well as streambank stabilization, monitoring, and maintenance features.

A “Certificate of Approval” is required from the WVDEP Division of Water and Waste Management & Environmental Enforcement – Dam Safety Section pursuant to West Virginia State Code, 47-34-4.

The Sponsors will provide leadership in developing an Emergency Action Plan (EAP) prior to construction and will update the EAP annually with local emergency response officials. NRCS will provide technical assistance in the preparation of the EAP. The purpose of the EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential problem with a floodwater retarding structure.

### **Project Cost**

Project costs include all costs necessary to install the recommended plan. Tables 1 and 2 display all estimated project costs. Costs for each project purpose were identified and allocated accordingly.

### **Construction Cost**

Construction cost accounts for all material, labor, and equipment necessary to construct the dam, auxiliary spillway, mitigation, and water supply. These costs were estimated using 2009 prices. Costs for the dam, auxiliary spillway, and water supply system were estimated during the planning phase. Mitigation costs were estimated using traditional methods such as computing quantities of work and material and multiplying that by unit costs taken from sources such as Means Cost Data or recent NRCS bid abstracts.

The planning construction costs are estimated. Detailed structural designs and construction cost estimates will be prepared prior to contracting for the work to be performed. Final construction costs will be those costs actually incurred by the contractor performing the work, including the cost of any necessary contract modifications.

### **Engineering Costs**

Engineering services include all costs associated with the design of the project and preparation of construction drawings. Engineering services cost for the dam design is the actual price paid to the engineering firm for designing the dam. The water supply design costs were estimated as percentages of the estimated construction cost for the respective items. NRCS engineering services cost was included for staff time for design contract supervision.

### **Project Administration Cost**

Project administration cost includes NRCS staff costs for contract administration, construction inspection, and coordination with property acquisition and utility issues. Costs for land surveys, title opinions, appraisals, review appraisals, negotiations, and relocation assistance advisory are actual contract prices that will be paid for those services. NRCS staff time was estimated based on anticipated salaries for personnel.

### **Real Property Rights**

The Sponsors will be responsible for 25% of the real property rights costs including costs necessary to obtain the land, easements, relocations, utility modifications, and rights-of-way needed to install the project. The acreage needed for purchase and easements was initially

estimated using Hardy County tax maps, topographic maps developed by the NRCS, and USGS 7.5 minute topographic maps. Property surveys were completed by project sponsors in 2008. Real property rights will be secured to the top of dam elevation for the flood detention pool. Values for land and structures were initially estimated with the assistance of local officials. Property appraisals were completed by project sponsors in 2008. Road relocations and associated costs were estimated from historical contract costs, updated to current prices. Other utilities were estimated using information obtained from maps, visual inspections, and available historic utility modification cost data. These cost estimates will change as more detailed data becomes available. Site 16 will require 234.4 acres (all or part of 14 parcels) of proposed fee take acquisition and 44 acres of permanent easement involving two additional parcels as well as the Forest Service parcel. There are a total of three residences whose occupants will be relocated as a result of project acquisition. In February 2009, Local Sponsors made offers on all parcels. Settlement has been reached on one property and one relocation has been completed. In the event that additional voluntary settlements are not reached, Local Sponsors may use eminent domain to acquire the property.

### **Relocation Payments**

Relocation payments are paid to families and businesses that have to be relocated as a result of the project installation. These payments enable relocated families to obtain new housing without undue financial hardship and assists businesses to relocate with minimal cost. Relocation costs are estimated using the guidelines set forth in the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended.

**Operation and Maintenance (O&M)**

The Sponsors will be responsible for operation and maintenance costs for the dams, including all annual costs needed to conduct yearly inspections, produce O&M reports, and perform necessary maintenance during the operational life of the project. A specific operation and maintenance plan, utilizing the NRCS National Operation and Maintenance Manual, will be prepared for Site 16 before issuing invitations to bid for construction. The term of this new O&M agreement will be for a period of 100 years, which is the life expectancy of the project.

**Installation and Financing**

The installation of the project is funded by the NRCS and the Sponsors. Technical assistance is provided by the NRCS. The Sponsors will be responsible for the construction costs and landrights associated with the water supply component at Site 16.

**Tabulation 7.**  
**LIST OF PREPARERS AND QUALIFICATIONS**

<b>NAME</b>	<b>PRESENT TITLE/ OTHER EXPERIENCE (Years in Job)</b>	<b>EDUCATION Degree(s) Continuing Education Subjects</b>	<b>OTHER (licenses, etc.)</b>
Andy Deichert	Civil Engineer (16)	BS & MS Agricultural Engineering	Registered Professional Engineer
Ed Kesecker	District Conservationist (31) (Retired 2007)	BS Agriculture	
Pam Yost	Economist (18)	BS Resource Management MS Agricultural Economics	
Timothy Ridley	Hydraulic Engineer (18) Consulting Engineer (8)	BS Civil Engineering	Registered Professional Engineer Professional Surveyor
Jeff McClure	Geologist (2) WV DEP Geologist (10)	BS Geology BA Biology	
Bryan Lee	Cultural Resources Specialist (5) Archaeologist (10)	BA Anthropology MA Anthropology	
Ron Wigal	Soil Conservationist (17) Environmental Specialist (3)	BS Wildlife Management MS Wildlife Management	
Thomas Tamasco	Civil Engineer (2) Dam Safety Engineer (7)	BS Civil Engineering Technology	Registered Professional Engineer
Kristin Smith *	Water Quality Specialist (6) Ecologist/Environmental Compliance specialist (5)	BS Environmental Studies MS Forestry	
David Heffington *	Corps of Engineers-Regulatory (13) Natural Resource Specialist/Ecologist (9)	BS Biology/Geography	
Matt Harrington *	Biologist/Environmental Scientist (12) National Environmental Coordinator (1)	BS Environmental Science /Biology MS Environmental Science	

\* NRCS Specialists who assisted with the preparation of 'Need and Purpose' and 'Cumulative Effects' sections

## LITERATURE CITED

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Bodor, Thomas and Karl Franz. 2008. Phase I Archeological Survey and Phase II Archeological Evaluation of Sites 46HY495, 46HY497, and 46HY501, Lost City, Hardy County, West Virginia. On file West Virginia Division of Culture and History, Charleston, WV.

Cardwell, Dudley H., Erwin, Robert B., and Woodward, Herbert P. 1968. Geologic Map of West Virginia. West Virginia Geological and Economic Survey.

Cremann, Gretchen, Alana Hartman and Neil Gillies. 2005. The Lost River Watershed Based Plan. WVDEP website publication. Charleston, WV.

Dean, S. L., Kulander, B. R., and Lessing, P., Geology of the Bergton, Lost City, Lost River State Park, and Orkney Springs Quadrangles, Hardy County, WV, West Virginia Geological and Economic Survey, 1992.

Development of Design Data for Planning and Preliminary Design of Lost River Site 16. 2005-2006. United States Department of Agriculture, Natural Resources Conservation Service.

Estepp, Ron. 1989. Soil Survey of Grant and Hardy Counties, West Virginia, United States Department of Agriculture, Soil Conservation Service.

Economic Summary, Workforce West Virginia, Research, Information, and Analysis, various issues.

Engineering News Record, March 2006 construction cost index. Website: [www.enr.com](http://www.enr.com)

Federal Energy Regulatory Commission. 2006. Cove Point Expansion Project – Final Environmental Impact statement. Washington, D.C.

Federal Energy Regulatory Commission. 2005. Hardy Storage and Transmission Projects – Environmental Assessment. Washington, D.C.

Hardy County Public Service District. 2003. Preliminary Engineering Report for Hardy County Public Service District Baker/Mathias Water Distribution System. Thrasher Engineering, Clarksburg, WV.

Niemel, Karen. 2005. Phase I Cultural Resources Report for Dam Site 16, Lost River Watershed, Hardy County, West Virginia. On file West Virginia Division of Culture and History, Charleston, WV.

Potomac Valley Soil Conservation District; Hardy County Commission; West Virginia Soil Conservation Agency; U. S. Department of Agriculture, Natural Resources Conservation Service and Forest Service. 2001. Final Supplemental Watershed Plan Agreement No. 3 and Environmental Assessment for Lost River Subwatershed or Potomac River Watershed, Hardy County, West Virginia. 12 pp.

Price, Paul H., Prouty, William F., Tilton, John L., and Tucker, R. C. 1927. Hampshire and Hardy Counties Geological Report, West Virginia Geological Survey.

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Washington, D.C.

U.S. Census Bureau; Census 2000, Summary File 1 (SF1) and 3 (SF 3); generated by Pam Yost; using American Factfinder; <<http://factfinder.census.gov/>>; (August 2004).

U.S. Department of Agriculture. 1992. National Watershed Manual. Soil Conservation Service.

US Department of Agriculture, Natural Resources Conservation Service and West Virginia Conservation Agency. April 2004. Hardy County Water Resources Report. [http://www.wv.nrcs.usda.gov/programs/watershed/lost/lost\\_river.html](http://www.wv.nrcs.usda.gov/programs/watershed/lost/lost_river.html).

United States Department of Agriculture. 2004. U.S. Census of Agriculture, Census 2002, Summary and State Data, Volume 1, Geographic Area Series, Part 51, National Agricultural Statistics Service.

US Department of Agriculture. 1990. Urban Floodwater Damage Economic Evaluation URB1, Soil Conservation Service.

US Department of Agriculture. 2005. Part 630 Hydrology National Engineering Handbook, Chapter 31, Computer Program for Water Surface Profiles. Natural Resources Conservation Service.

US Department of Agriculture. 1992. Technical Release No. 29 (TR-29) Project Formulation Hydrology. Natural Resources Conservation Service.

U.S. Department of Agriculture, Rural Utilities Service. 2004. Supplemental Environmental Report for the Hardy County Public Service District – Baker/Mathias Water Distribution System Raw Water Treatment Plant. Thrasher Engineering, Clarksburg, WV.

U. S. Department of Agriculture, Soil Conservation Service. 1974. Lost River Subwatershed of the Potomac River Watershed, Hardy County, West Virginia – Environmental Impact Statement. 91 pp.



U. S. Department of Agriculture, Soil Conservation Service. 1994. Environmental Information Report – Dam Site 27 – Upper Cove Run, Lost River Watershed, Hardy County, West Virginia. 13 pp.

U. S. Department of Agriculture, Soil Conservation Service. 1990. Supplemental Information Report - Lost River Watershed Project, Hardy County, West Virginia. 18 pp.

U. S. Department of Agriculture, Soil Conservation Service. 1989. Addendum to Lost River Subwatershed of Potomac River Watershed Environmental Impact Statement – Environmental Assessment Report for Dam Site No. 4, Kimsey Run, Hardy County, West Virginia. 18 pp.

U.S. Department of Interior, Fish and Wildlife Service. 1980. Habitat Evaluation Procedures (HEP). Ecological Services Manual (ESM) 102. U.S. Fish and Wildlife Service, Division of Ecological Services. Government Printing Office, Washington, D.C. 84pp.+ appendices.

US Department of Interior, Fish and Wildlife Service and US Department of Commerce. 2002. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation – West Virginia.

U.S. Environmental Protection Agency. 1998. Fecal Coliform TMDL Development for Lost River, Hardy County, West Virginia. EPA Region 3, Philadelphia, PA.

US Geological Survey. <http://nwis.waterdata.usgs.gov/nwis/gwdata>.

US Water Resources Council. 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,

WV Department of Transportation, Division of Highways and the Federal Highway Administration. 1996. Appalachian Corridor H, Elkins, West Virginia to Interstate 81, Virginia. Final Environmental Impact Statement, Charleston, WV.